An investigation into the pedagogical beliefs and online teaching practices of university teachers

Doctorate in Social Science

University of Leicester

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Declaration

This thesis is original work and has been conducted during the period of registration. It is submitted in partial fulfilment of the regulations for the Doctorate in Social Sciences, University of Leicester.

Signed:

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Date: 14th February 2011

Word length: 51,280 words (excluding references)

Abstract

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A gap between university teachers' beliefs and practices has been identified in the literature (see Murray and Macdonald, 1997; Prosser et al, 2003; Dunkin, 2002; Samuelowitz and Bain, 2001; Jelfs et al, 2006; and Richardson et al, 2007). This literature indicates that a teacher may claim to hold beliefs that students learn through a process of social construction but their practices when they teach reveal that they adopt more of a 'transmission' mode. This is considered to have an impact upon the quality of the student learning experience (Prosser and Trigwell, 1999).

Due to the increased use of online learning environments in higher education this thesis extends the research on beliefs and practices; specifically examining the relationship between pedagogical beliefs and online teaching practices. The thesis reports findings from two surveys: firstly a group of 32 teaching 'experts', known as National Teaching Fellows and second a survey of over 529 university teachers from across the UK, who have no expert teacher status, described here as non-experts. Both groups answered questions on their beliefs and online teaching practices, using a revised version of an instrument devised by Norton et al (2005).

The thesis finds a gap between all teachers' pedagogical beliefs and online teaching practices; however it is found that expert teachers' beliefs and practices are more closely aligned than non-expert teachers' beliefs and practices. The implications of these findings are that in order to ensure quality student learning experiences, university teachers should pursue formal teaching qualifications and become more involved in ongoing development events. It is acknowledged that these recommendations should work in concert with university progression and promotion policies.

Acknowledgements

I wish to acknowledge the support of my employer, Liverpool Hope University, for sponsoring my doctoral studies and enabling the completion of this work.

I am indebted to all the university teachers who responded to my survey and in particular to those who gave their time to make additional comments about their experiences of using online learning environments.

I am further indebted to my supervisor, Dr. Henrietta O'Connor, for taking over the supervision of this thesis in its' final stages. Thank you for your encouragement, willingness, guidance and good humour.

My love and thanks to my friend and mentor Professor Lin Norton. Thank you for your belief in me. Also thanks to Lin's husband Bill for his patience and kindness in my struggles with statistics.

My love and thanks always to my parents, Frank and Mary Lunt.

Finally, but most importantly, I want to thank my husband, John and our four wonderful children, Mark, Tom, Katy and James. I want to say sorry for living in the study for the last five years, and thank you for doing everything so that I didn't have to. You are all my pride and joy. dB Owie. This is proof, if ever proof were needed, that when things seem impossible just remember the words of the immortal Dory (2003) and "Just keep swimming."

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Glossary

Becta	British education and communication technology agency
BMAF	Business, Management and Finance Learning Teaching Support Network
DfES	Department for Education Studies
CBI	Confederation of British Industry
CETL	Centre for Excellence in Teaching and Learning
C&IT	Communication and Information Technology
HE	Higher Education
HEA	Higher Education Academy
HEI	Higher Education Institution
HEFCE	Higher Education Funding Council for England
HELF	Heads of E-Learning Forum
JISC	Joint Information Systems Committee
KT	Knowledge Transmission
LF	Learning Facilitation
OECD	Organisation for Economic Development and Cooperation
OLE	Online learning environments
MANOVA	Multivariate analysis of variance
NCIHE	National Committee of Inquiry into Higher Education
NTF	National Teaching Fellow
NTFS	National Teaching Fellowship Scheme
UK	United Kingdom
UKeU	United Kingdom e-University
UNESCO	United Nations Education, Scientific and Cultural Organisation
VLE	Virtual Learning Environment

Chapter 1

The influences on university teachers' pedagogical beliefs and online teaching practices

1.1 Introduction

The purpose of this research is to investigate the beliefs and practices of a range of university teachers when teaching via online learning environments. The research will consider different groups of teachers: firstly a group of teachers nationally acclaimed for their expertise in online learning known as 'National Teaching Fellows' (NTF), hereafter known as 'expert teachers'; and secondly other university teachers who hold no expert teacher status, hereafter known as 'non-expert teachers'. It will attempt to establish whether teachers' beliefs are consistent with their practices when teaching in online environments and will go on to investigate the differences in practices in this environment between the expert and non-expert groups and consider the reasons for any differences. The main objectives of this study are:

1. To discover whether university teachers' pedagogical beliefs are consistent (i.e. aligned) with their online teaching practices;
2. To compare the degree of alignment between 'expert' teachers' pedagogical beliefs and online teaching practices with the alignment

of ‘non-expert’ university teachers’ pedagogical beliefs and online teaching practices;

3. To identify the reasons for any differences between pedagogical beliefs and online teaching practices in both groups; and finally
4. To consider the implications of the research findings in terms of professional development in this field.

This study builds on existing research in this field, drawing upon Gow and Kember’s (1993) research distinguishing a ‘Learning Facilitation’ approach and a ‘Knowledge Transmission’ approach; and Trigwell and Prosser’s (1996) distinction between ‘Student-centred’ and ‘Teacher-centred’ approaches to teaching. Gow and Kember’s (1993) distinction identified two distinct teaching approaches. A Learning Facilitation approach is characterised by teachers who aim to motivate their students; have a pastoral concern for their students; facilitate student’s learning; are keen to teach ‘interactively’ and who seek to teach students through encouraging problem solving activities. Such attributes are distinguished by Trigwell and Prosser (1996) as ‘Student-centred’, i.e. the teacher focuses upon the student’s activities in order to facilitate their learning. Conversely a ‘knowledge transmission’ approach is characterised by university teachers who seek to ‘transfer information’ from themselves to their students; who teach students specific skills in order to prepare them for work; have a high concern for their own expert knowledge and finally use media in order to transfer information more readily.

Prosser and Trigwell (1999) describe these approaches as 'Teacher-centred', i.e. the teacher is most concerned with their own actions in the teaching situation.

Understanding teachers' approaches to teaching is important because of the effect these approaches have on student learning. Trigwell and Prosser (1996) found that teachers who took a 'student-centred' approach were more likely to have students who took a 'deep' approach (Marton and Säljö, 1976) to their learning. Deep learning is also associated with metacognition and 'lifelong learning' (Kirby et al, 2010) and for developing the skills and abilities required for an unknowable future (Barnett, 2004). The implication here is that university teachers need to encourage a deep approach to learning in their students in order to prepare graduates for an uncertain economic future; and that this can best be achieved through a 'learning facilitation/student-centred' approach to their teaching.

The distinctions between 'learning facilitation/student-centred' and 'knowledge transmission/teacher-centred' have been widely researched in traditional teaching environments but not so in online teaching. With the increasing use of online learning environments in higher education it was therefore considered timely to assess the nature of teaching practices when using this technology and to determine whether this practice is aligned with teachers' pedagogical beliefs. If gaps between beliefs and practices are identified, as in other research in more traditional teaching environments, then there are implications here for student learning and for professional development in the field.

The range of terms used in this thesis requires definition. A 'belief' is something that is held to be true by the individual holding it, which guides their thinking and actions.

> "a belief is a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and is therefore imbued with emotive commitment; further it serves as a guide to thought and behaviour." (Borg, 2001:186)

As Nespor (1987) describes beliefs rely on episodic memory and that early events colour perceptions of subsequent events, especially where they are vivid or unique. These past events provide an 'intuitive screen' (Goodman and Darr 1988) through which we later filter new information and experience. 'Teachers' beliefs' is a term that has been used to describe teachers' pedagogical beliefs (Calderhead, 1999) and considers their beliefs about learning, teaching and practice. The statements made by teachers concerning their teaching could be described as their 'espoused beliefs' (Argyris & Schon 1978), i.e. their ideal conception of how things should be. Practices describe individuals' actions in given situations. Practices are the actions taken by individuals and can be analysed in terms of their alignment with the individuals' stated beliefs. Practices can be described as 'theories-in-use' (Argyris & Schon 1978), i.e. a description of what is actually done. The present study does not observe teachers' online practices however and these are only self-reported. A more accurate term to use could therefore be 'intentions' (as used by Norton et al,

2005) as this describes what the individual states they intend to do in a given situation. This can differ from beliefs in that it illustrates what may actually be done in a given situation. Where there is a difference between beliefs and practices there is clearly an area for research in terms of uncovering unconscious beliefs, understanding the reasons for these and analysing their impact on actions. Researchers frequently look at 'intentions' when working with self-reporting instruments, as it often proves difficult in practical terms to carry out the analysis on actual behaviours. For the purposes of the present study the term 'practices' will be used as it is more readily distinguishable from the concept of intentions.

Many definitions and terms are used for the online technologies used in teaching and learning. Commonly used terms include: e-learning environments; online learning environments; virtual learning environments; technology mediated learning environments; and/or, learner management systems, to name but a few. The term Virtual Learning Environment (VLE) tends to be restricted to the use of proprietary or 'in-house' learning environments. Bach *et al*, (2007:71) provide the Joint Information Systems Committee (JISC) (2002) definition, 'The JISC defines a VLE as the online interactions of various kinds which take place between learners and tutors including online learning.' Many practitioners use non-institutional mediums however, such as Facebook, and Twitter which cannot be overlooked when considering teaching in online environments. Many terms are used interchangeably and so for the purposes of this thesis the term online learning

environment (OLE) will be used in order to encompass all 'venues' for such interactions to take place.

This thesis will consider the role of the university teacher as the architect of learning situations. Some universities have created new posts, with a variety of titles such as 'learning technologist' (Conole *et al* 2007), but it will be argued that the university teacher plays a crucial role in the success or otherwise of all student learning, including within online learning environments. Teachers are gatekeepers to learning and there is much literature (Dall'Alba, 1991; Bruce and Gerber, 1995; Willcoxson, 1998; Gibbs and Coffey 2004; Kember and Kwan, 2002; Skelton, 2005; Fanghanel, 2007) to support the concept that teachers' beliefs about how students learn have real impact on the way in which they teach.

A gap between university teachers' beliefs and practices/intentions has been identified in the literature (see Murray and Macdonald, 1997; Prosser *et al*, 2003; Dunkin, 2002; Samuelowitz and Bain, 2001; Norton *et al,* 2005; Jelfs *et al*, 2006; and Richardson *et al*, 2007). For example, a teacher may claim to hold beliefs that students learn through a process of social construction but their practices reveal that they adopt more of a 'transmission' mode. This thesis builds on this earlier work. The original contribution to knowledge comes from the specific focus on a range of university teachers' pedagogical beliefs and online teaching practices; and

from an empirical analysis in the higher education sector. Furthermore, it is hoped that knowledge about university teachers' pedagogical beliefs and online teaching practices will inform the debate on appropriate staff development in this area. Steel's (2009) qualitative study of three expert e-learning practitioners reveals the need for such research,

> "….. future studies of the same nature should be conducted with university teachers who are more representative of the academic population and those who are challenged by the use of LMS [Learner Management Systems] or do not see a role for such technologies in their university teaching. These kinds of studies would make a valuable contribution to our understanding of technology uptake and use in university teaching and learning." (Steel, 2009:414)

Wozny et al (2006) perceive the need for more research, but consider that empirical research would be more appropriate; with which Lim and Chai (2008) concur

> 'more empirical studies are needed to examine whether these beliefs have an impact on the teaching and learning practices in computer-mediated learning environments' (Lim & Chai, 2008:808)

The present study uses quantitative and qualitative methods of investigation. This was considered appropriate in order to obtain a clear overview of practice within the sector. It is hypothesised that there will be significant differences between university teachers' pedagogical beliefs and online teaching practices, and between different groups of teachers, and this information could not be gained from isolated qualitative studies which are frequently heavily dependent on context for their meaning. By gaining an understanding of online practices within the sector and its association with teachers' pedagogical beliefs it is anticipated that this will provide

insights into whether teachers' are using technology in ways advocated in the literature and the implications of this if they are not.

1.2 Technology and widening participation

Much has been promised by technology in terms of its ability to support student learning in the twenty first century but many university teachers have failed to embrace these possibilities and effective online teaching remains the preserve of a few (Brabazon, 2007). The political, economic social and educational imperatives for learning technology use in Higher Education Institutions (HEIs) are highlighted at national level by the Department for Education Studies (DfES, 2005). The use of technology in higher education has also been promoted and underpinned with funding and incentives by the Higher Education Funding Council for England (HEFCE). HEFCE's (2009) e-learning strategy outlined the benefits for HEIs engaging with e-learning technology and is related to HEFCEs (2007) strategic aims of widening participation and enhancing the quality student learning experience. There have been a range of incentives for HEIs to engage with learning technology through targeted funding initiatives and allocations including capital investment funding. Guidance is provided to HEIs from the Higher Education Academy (HEA) and other support networks. The Joint Information Systems Committee (JISC) is concerned with embedding online learning within HEIs often through a 'best-practice' approach (JISC, 2006). It is believed that use of learning technology can

enhance the student experience, provide greater flexibility, enable links to be made between home, work and study and develop skills in autonomous learning (HEFCE, 2009).

Hand-in-hand with this had been the UK government's (1997-2010) desire to widen and increase participation in higher education. Resourcing such expansion in terms of staff numbers however has not followed (Weller, 2007). There is a desire to control such costs and allow technology to fill some of the teaching 'gap'.

> "The change in learning and teaching has been primarily driven by the managerialist modernisation of higher education with the imperative from politicians and business that it must find a way of managing and structuring the growth of higher education into a mass activity for the majority, rather than it remaining the traditional preserve of an elite minority." (Bach et al, 2007 p.146)

The success of technology mediated courses and the use of technology to support students on more traditional programmes has a chequered history however, (see for example Noble, 2004; Brabazon, 2002; Carr-Chellman, 2005). A range of causes for these early problems have been suggested, such as, for example: an early focus on the technology used and its (lack of) reliability; student motivation; and inadequate staff training. Appropriate pedagogical design is one of the factors considered to be essential in achieving effective online learning, but this has been found wanting in many courses,

> ‘Reviews of the use of virtual learning environments (VLEs) consistently find that they promote design approaches that are either based on the content of materials or on non-pedagogical aspects of course administration (e.g. Britain and Liber 2004).’
>
> (cited in Beetham and Sharpe, 2007:27)

Academic staff are largely responsible for the design of their teaching, though there are systemic factors (Biggs and Tang, 2007), such as context, discipline and institutional procedures, ultimately university teachers decide the curriculum and how it will be taught. This study will therefore focus upon the pivotal role played by university teachers as the designers of learning. There is some suggestion that many university teachers are reluctant to give their energies to learning and teaching activities in general and to considering the use of technology in teaching in particular. Learning and teaching is often seen to be a lower status and unrewarded university activity, unlike discipline research. As Kane *et al* (2002) state, university teachers are:

> ‘trained as researchers, this means that they are often well prepared for the research role. In contrast, many academics have had little or no formal teacher education to prepare them for the teaching role.’
>
> Kane et al (2002:181)

Martin Weller (2007) agrees and sees a reluctance to change,

> ‘Their job, and inclination, is to teach and research in their subject and remain up to date in their field, not to continually develop new skills in using technologies or become experts in educational theory.’
>
> Weller (2007:1)

Little is known about how academic staff currently design their online teaching, 'the process of course design is complicated, and often remains a private, tacit process.' (Sharpe & Oliver, 2007:41) and despite a large body of literature aimed at supporting good practice in this area (see for example Salmon, 2003 and 2004; Laurillard, 2002; Jochems et al, 2004; Littlejohn and Pegler, 2007; and Weller, 2007) little is known as to what actually occurs, 'although we can see that there has been plenty written on how academics ought to design curricula, less attention has been given to how they actually do so' (Oliver 2003). It is an intention of this thesis to attempt to uncover what practice actually occurs when expert and non-expert teachers teach in online environments.

1.3 Historical context

The role of universities has changed over recent years and there has been much debate as to their purpose. John Henry Newman (1801-1890) believed that universities should offer opportunities for learning for its own sake, rather than to prepare individuals for specific work (Kreber, 2009). For many years universities maintained a privileged position in terms of the generation of knowledge. This process was largely free of political interference and universities enjoyed significant autonomy (Barnett, 1994). However, by the 1960s the changing function and expectations of the university were emerging with Kerr (1963) renaming it 'multiversity', believing that the modern university had to serve multiple purposes

and the notion of a unity of knowledge was impossible in the modern world. The growing influence of disciplines was also noted and these came to be described as 'academic tribes' (Becher, 1989). Becher believed that disciplines were characterised by their 'traditions, customs and practices, transmitted knowledge, beliefs, morals and rules of conduct, as well as their linguistic and symbolic forms of communication and the meanings they share' (1989:24). Donald (1995) concurred 'the method by which knowledge is arrived at in a discipline, the process of knowledge validation, and the truth criteria employed in that process are essential to the definition of a discipline' (Donald 1995:6). It could be argued that academic disciplines act as regimes of truth, in that their very power enables them to legitimate claims to knowledge. Discipline is therefore potentially significant in determining teachers' conceptions of knowledge and consequently may influence their pedagogical beliefs and practices.

Disciplines have been found to be powerful groups within universities but there has also been a rise in managerialism within HE in recent years. Many (Marginson and Considine 2000; Altbach 2000; Codd, 2005; Zipin and Brennan, 2003) believe that this change to the structural power of HE institutions has come about due to governments' increasing interference in higher education and that this has promoted an instrumental culture which wishes to see an economic benefit for the state as a result of taxpayer funding. Other commentators however believe that the purpose of education is to emancipate humanity, not to subjugate peoples to

the dominant power systems of the ruling elite. See, for example, Habermas (1978) and de Freire (1997). Barnett's (1992a, 1992b) 'marginal perspective' of higher education is linked to the consideration of higher education as an educational process, focussed on the development of an individual's intellectual and life-long learning capabilities.

> '"Higher" education is not merely "additional" education; not simply more of what has gone before. The title signifies a particular kind and, indeed, level of intellectual attainment.' (Barnett 1992b: 17)

Intellectual attainment and emancipation are also key purposes for other commentators. Harvey (1997) argues that the quality assurance demands placed on higher education require universities to provide a life-enhancing and life-changing education,

> 'The transformative notion of quality presupposes a fundamental purpose of higher education. It assumes that higher education must concern itself with transforming the life experiences of students, by enhancing or empowering them' (Harvey 1997:140).

The culture, vision and mission of the university are other considerations in reviewing the purpose of universities and Schwartz (2003) believes that most 'religion-based' universities still have a clear purpose for their students in developing their values and morality. Even 'religion-based' universities get much of their funding from the public purse however, so it could be argued that this is not a

particularly significant difference. Nevertheless Schwartz believes that other universities have a more ambiguous purpose,

> 'Abandoning their moral purposes has led universities to stress their utilitarian nature - get a degree and get a better job. Universities and their representative bodies routinely trumpet their economic impact. We have put so much emphasis on this aspect of our activities that the government now believes that universities exist mainly to bolster the economy.' (Schwartz, 2003: Times Higher Education online)

The pursuit of capitalist agendas has been instrumental in diverting the purpose of universities. John Holford (2008) bemoans the assumptions made by government and others of the role of universities

> '[…..] as the nation's leaders grapple with the fallout from their infatuation with all things corporate, it is time to imagine again a wider purpose for universities than "serving the economy"'. (Holford, 2008: Times Education Supplement online)

This 'wider purpose' may be some time in coming however. In 2009 universities came under the central control of the Minister for Business and Industry within the UK, clearly indicating the government's expectations of the purpose of a university education and remained there under the new coalition government of 2010. Employability has been identified by many as an important graduate attribute for new economies (Knight & Yorke, 2003;DFES, 2003; UNESCO, 1998) but this is frequently rejected by the academic community who may have more purist notions of the purpose of higher education.

The lack of unanimity of the purpose of Higher Education is an important consideration in this research. Without a clearly understood and agreed objective on the purpose of universities and the role of university teachers within them, teaching practices will be influenced by multiple demands. These demands compete for attention and the impact of this upon teaching in general and online teaching in particular will be a key consideration in this study.

1.4 Conclusion

Universities are therefore subject to pressures from government to increase the use of technology, but their academic teaching staff display a reluctance to engage with it, a situation possibly exacerbated by earlier, well-publicised, failures (see, for example, Iskander, 2007). The remedy to staff reluctance in this area has often been an interventionist approach to staff training and development in the affordances (Gibson, 1979) of the technology itself (Conole and Fill, 2005). However it will be argued that such interventions are insufficient in themselves to change practice in any substantial way. As Putnam and Borko (1997: 1281) point out 'for professional development experiences to be successful in supporting meaningful change, they must take into account and address teachers' knowledge and beliefs' with which McAlpine and Weston (2000:377) concur 'Fundamental changes to the quality of university teaching... are unlikely to happen without changes to professors' conceptions of teaching.' Zhou & Xu, (2007) extend this to the realm of

technology use and believe that in order to understand teacher use, or non-use, of technology it is necessary to first uncover teachers' pedagogical beliefs.

The literature has identified a gap between university teachers' pedagogical beliefs and teaching practices and implies that this may negatively impact upon the quality of student learning. Due to the increasing use of online technologies in university teaching this thesis seeks to discover whether a gap between beliefs and practices also exists in online teaching and will consequently consider the implications of the research findings in terms of student learning and staff development in this field. An outline of the following chapters is provided below.

Chapter two focuses on the literature on pedagogical beliefs and practices. It discusses the prevailing theory of learning in HE teaching, constructivism, and illustrates how this has influenced the research on teachers' approaches to teaching. The chapter goes on to consider the impact of new technologies on teaching practices and the prevailing pedagogies in this area. It concludes by reviewing staff development in this field to date.

Chapter three outlines the methodology used in this thesis and describes the, mainly, quantitative methodology adopted, together with a detailed description of the questionnaire used, the pilot study and the two groups of respondents, i.e.

'expert' and 'non-expert' teachers. The chapter concludes with a consideration of the ethics of this study and the formulation of the hypothesis.

Chapter four begins the analysis of data. This chapter analyses the data from the non-expert sample. It firstly conducts correlations and factor analysis to consider alignment between beliefs and practices, but little alignment is found. It then moves on to conduct paired sample t-tests to measure the size of the gaps between beliefs and practices and finds that although university teachers are most likely to express a belief in learning facilitation they are unlikely to practice this when teaching in an online environment. Multivariate analysis of variance (MANOVA) establishes that those teachers most likely to take a learning facilitation approach are female; those with more than six years experience; those with teaching qualifications; those who are fellows of the Higher Education Academy (HEA); and those who have received some training or development in the use of online environments. Finally it considers the qualitative data gleaned from the survey and finds an overwhelmingly negative response by participants, which indicates an aversion to using online learning environments partly exacerbated by multiple demands on their time and a perception that learning and teaching are less important than disciplinary research.

Chapter five continues the analysis of data focussing upon the response to this survey given by 'expert' (National Teaching Fellow) teachers. It, again, begins with correlations and factor analysis and finds a significantly different result. Here 'expert' teachers' beliefs and practices are aligned in four of the five learning facilitation subsets and two of the four knowledge transmission subsets. Paired sample t-tests were also conducted and the gap found between non-expert teachers' beliefs and practices is found to be smaller for expert teachers; although a gap does still exist in some subsets. Due to the finding of a bimodal histogram, a further analysis of expert teachers based exclusively on the beliefs subset 'imparting information' was also conducted and it was found that this further distinguished the expert teacher group. These findings suggest that those expert teachers who believed that teaching is concerned with transfer of knowledge were likely to teach a science subject. When this small subgroup was removed from the main group of expert teachers it could be seen that their beliefs and practices were less aligned than the other groups. An analysis of expert teachers' qualitative remarks was then conducted. Once again the finding here was very different from that provided by the non-expert teachers. Expert teachers were largely positive about their experiences of using technology and reservations, where any were expressed, were reserved for the management of their universities. The chapter ends by summarising the key differences between expert and non-expert teachers.

Chapter six discusses the implications of the findings. It returns to the main themes of the contested purpose of universities, the pedagogical literature, the impact on student learning and the implications for staff development in this field. It concludes that non-expert teachers' beliefs and practices are not aligned and significant differences exist between their beliefs and practices in all learning facilitation subsets. The literature suggests that these teaching approaches are less likely to encourage students to take a deep approach to their learning which implies that the quality of student learning will, therefore, be negatively impacted.

Conversely expert teachers were found to have more aligned beliefs and practices and the conclusion drawn here is that it is this factor, i.e. the existence of pedagogical beliefs which underpin and inform online teaching practice which has been a key factor in expert teachers' success and acclaim as National Teaching Fellows. In addition expert teachers' willingness and ability to use online technologies as part of their teaching appears to be important. It is acknowledged nevertheless that some expert teachers' beliefs and practices are not as aligned as others and so there may be other factors, not identified here, which contribute to this outcome.

The final section returns to the theme of staff development. It suggests that university teachers should be further encouraged to gain professional teaching

qualifications, but warns against an essentially instrumental approach that such a demand may engender. A more active and ongoing developmental approach is recommended, using the support provided by more expert mentors and encouraging university teachers to take part in researching their own pedagogical practice in order to enhance student learning. The importance of underpinning progression and promotion strategies is also acknowledged. The chapter concludes by describing the limitations of the present study and makes recommendations for future research in this field.

Chapter seven concludes the study summarising the main findings for both groups of teachers and revisits the recommendations for future staff development strategies.

Chapter eight is provided as an 'afterword' and contains the authors' personal reflection on the research process.

Chapter 2

The literature concerning university teachers' pedagogical beliefs and online teaching practices

2.1 Introduction

This chapter explores the prevailing theory of learning in Higher Education, constructivism, (Biggs and Tang, 2007; Ramsden 2003; Salmon, 2003, 2004; Fry et al 2008; and Laurillard, 2009) and provides a detailed analysis of the literature on teachers' pedagogical beliefs and teaching practices which is extended into the specific field of online teaching practice. The chapter concludes by examining the nature of staff development, in particular as it impacts upon online teaching, and considers what it may have to offer in terms of affecting pedagogical beliefs and online teaching practices.

2.2 Constructivism

The HE pedagogical literature has been heavily influenced by constructivism in recent years. Cross (2009) states that 'Constructivism is an umbrella term for a clutch of theories which stress the importance of active engagement of learners in their learning' (Cross 2009:17). Constructivism suggests that we learn by making

meaning or creating our own knowledge and understanding of the world through our activities such as language and other systems (Bruner, 1996).

The concept of constructivism comes from cognitive psychology and owes much to the work of Jean Piaget (1971) who suggested that learners learn in individual ways creating, constructing, adapting and refining knowledge through individual experience. Piaget (1971) emphasises the cognitive and biological mechanisms associated with learning, which suggests that learning takes place through a series of networks which learners use to make multiple connections with existing knowledge and thus create meaning. Another significant voice, Vygotsky (1978), however, emphasises the social elements of learning. He also believed that knowledge is internally constructed but in particular recognises the importance of social interactions as the catalyst for that learning. For Vygotsky (1978) knowledge is created through these cultural encounters and shared in a 'zone of proximal development' (ZPD); in the ZPD less knowledgeable or experienced students work collaboratively with more knowledgeable/experienced others in order to create meaning. For Piaget (1971) then, student's conceptual and sensory-motor engagements were the foci of learning, whereas for social constructivists knowledge is constructed through social interaction. For both, knowledge is constructed through a process of restructuring and reorganising knowledge and is therefore perceived to be unique to each individual.

Socioculturalists agree that there is a degree of agency in learning but unlike constructivists, they believe that meaning is not necessarily unique to an individual, but rather the product of multiple transactions created through a process of relational activities. Information processing models of learning also overlap with constructivism to some extent in that both theories acknowledge the need to selectively attend to a specific question with which the student needs to actively engage and that connections are made with existing knowledge. In these models however, the structures within which new knowledge is stored pre-exist and are used to store information for future use. The emphasis then is more on recording and accommodating new knowledge rather than interpreting it and reworking the structures within which that knowledge exists.

Multiple views of how learning takes place have therefore led to multiple ways of researching learning. The methodologies adopted have been heavily influenced by the initial assumptions of how learning occurs, i.e. whether coming to know 'is located in the head or the individual-in-social-action' (Cobb, 1994:13). Constructivist and socioculturalist theories of learning therefore differ from objectivist models of learning which assume that knowledge can be directly transported into a student's head and that the student has little agency in determining what is ultimately learnt. Nevertheless, both theories of learning emphasise the necessity of student activity in order for learning to take place and it

is argued here that these concepts have been hugely influential in espoused pedagogies in Higher Education.

Whilst the literature of student learning has largely adopted constructivist mantras it should be noted that these theories are theories of learning and not of teaching. Teaching and learning are not the same things and the complexity of using learning theory to determine appropriate teaching practice is problematic. Learning is not dependent on teaching and many students learn in spite of their teachers. Many researchers (see section 3.4) have attempted to bridge the divide between learning and teaching and to establish causal links between these activities. However the nature of this enquiry is complex and it is acknowledged that the interrelationship between them is far from straightforward. This thesis adopts a position which accepts that a link between learning and teaching exists but accepts that both learning and teaching are influenced by multiple factors which it is not possible for this study to consider in depth.

It is argued then, that constructivism focuses on the learner and is described as 'student-centred' as it concerns itself with what the student does. Conversely objectivism concerns itself with what the teacher does, i.e. prepares appropriate information which can be transported to the student, and is described as 'teacher-centred'. In 'teacher-centred' scenarios the teacher transmits information to their class in the belief that knowledge and meaning are simultaneously transmitted. Objectivism assumes knowledge to be a concrete 'real' thing, external to the

student. With constructivism however the process of knowledge construction is internal, with the student assimilating and accommodating new knowledge with existing knowledge structures.

So, constructivism is a theory of learning that departs from traditional notions of how individuals learn and in reconceptualising how students learn the academic community has begun to address how it teaches. University teachers still have a great deal of autonomy as to how they teach, 'Although culture and context create norms of teaching practice ... teachers can chose, within these limits, the approach that works for them. This autonomy provides teachers with choices to adopt, adapt, or reject an instructional reform', (Dexter et al, 1999:224). Even where new university teachers are exposed to constructivism this may not be enough to change their teaching practices however,

> 'to understand constructivism, knowledge of its underlying principles is a necessary but insufficient condition. […] To *know about* constructivism, then, is difficult enough, but transforming classroom practice in meaningful, coherent ways requires that one also has to come to *think* as a constructivist.' (Windschitl, 2002:143, emphasis in the original)

In a model similar to Fanghanel (2007), Windschitl (2002) posits that teachers' day-to-day challenges are products of the interplay of four domains' namely conceptual, pedagogical, cultural, and/or political. He believes that the move towards constructivism requires the teacher to not only learn new skills but also to

understand, and accept, the philosophy of constructivism. Following this 'conversion' teachers then need to alter their practices to bring them in line with this new philosophy, which accords with Biggs (1999) 'constructive alignment' in order to achieve the desired learning outcomes. In addition to this Windschitl (2002) believes that it is necessary to promote these new teaching practices to peers, administrators, and all stakeholders, because these concepts can be readily shunned by other powerful stakeholders and conflicts can arise as to their use. As already noted, some stakeholders may, for example, perceive teachers as technicians, who merely carry out the demands of senior managers or more powerful groups within society and constructivist teaching methods can be seen as too radical and dismantling the status quo.

For some however the argument for constructivism has gone too far and Phillips (1995:5) states that,

> 'Across the broad fields of educational theory and research, constructivism has become something akin to a secular religion'.

Young (2008) goes further and suggests that the emphasis on constructivism has had a 'stranglehold' on thinking about pedagogy in Higher Education. He suggests that educators' willingness to accept (or 'inability to resist', Young 2008:202) new pedagogical concepts came about through their unquestioned acceptance that learning was socially constructed through authoritarian, bureaucratic and

hierarchical educational structures. Young believes that constructivism suited Marxist ideologies prevalent in much of education. If constructivists were right and knowledge was socially constructed then this gave weight to the argument that intelligence, ability and attainment were arbitrary and the massification and democratisation of HE was justifiable as a means of social mobility and in order to promote talent from all quarters of society.

Critics of constructivism are dismissive of the 'knowledge' that is gained through construction. The suggestion is that if we use immanent criteria (only capable of being judged by someone who knows it, for example the Azande system (Potter, 2000:106) then we slide towards a chaos of epistemological relativism, of having no common understandings or have the need for over lengthy disclaimers at the start of all communication. Young (2008) believes that the role of knowledge has been undermined by constructivism, ultimately leading to a nihilistic worldview,

> 'by undermining any claims to objective knowledge or truth about anything, social constructivism […] denies the possibility of any better understanding, let alone any better world.' (Young, 2008:204)

Notions of constructivism are particularly heavily influenced by 'social construction' ideas. The emphasis here is on the student being *active* in their own learning, connecting new ideas with existing knowledge, sense-making and theorising. Piaget (1985) emphasised the need for other learners to act as the catalysts of

perturbation. This emphasis on activity, i.e. that knowledge is constructed with others, has been disputed however. For example von Glasersfeld (1993) points out, all mental activity is also constructive as students, often passively, individually, consider new knowledge and its place in their understandings. The emphasis on activity, group work and discussion is therefore downplayed in cognitive construction, with the student learning individually, 'perturbed' by reading and other media. Knowledge is therefore constructed by the individual and then mediated socially.

Like Young (2008) other commentators (Pring, 1972; Muller, 2006) argue for social realism rather than social construction. They believe that it is necessary to accept the existence of some concrete knowledge arguing that without some certainties we cannot progress; teachers, for example, do need to understand the subjects they teach more fully than their students. A teacher who asks a student to read or listen to a lecture, therefore, is not necessarily taking an objectivist approach as their broader pedagogical intention may include this feature as part of conceptual constructivism and not knowledge transfer.

Notions of constructivism have also heavily influenced the literature on teaching and learning online. Diana Laurillard (1993) was amongst the first to highlight the use of online learning environments as social learning spaces, based on Vygotsky's

(1978) zone of proximal development. She introduced her 'conversational framework' illustrating how new technologies could be used to reveal, share, interact, revise, discuss, and produce, i.e. construct knowledge. Laurillard (2009) continues to promote the 'conversational framework' illustrating the need for both 'discursive' exchanges and 'experiential' opportunities. Her emphasis here is on collaboration rather than co-operation, i.e. providing an environment in which students can compare their interpretations of tasks and use this collaborative endeavour to refine their own understanding.

There is a strong emphasis on communication and activity in much of the other contemporary literature. For example, 'collaboration and the opportunity to collaboratively construct knowledge are seen as important elements of an authentic e-learning model'(Herrington et al, 2010:28); Littlejohn and Pegler (2007:47) note that informal learning within online environments is experienced as a part of a 'community of practice' (Wenger, 1999), where students can be invited to share and review resources, 'working and learning together'; and Salmon's (2004) five stage model is also rooted in social constructivist principles. As Oliver (2003) has pointed out however we know more about how online learning environments should be designed than how they actually are and one of the aims of this study is to establish what sort of online practices are being used and whether these are in line with recommendations from the literature.

2.3 Student's approaches to learning

The literature on constructivism has led to the investigations of students' approaches to learning. Support for the belief in constructivism has come mainly from the pedagogical literature in student learning in higher education. Marton and Säljö 's (1976) seminal work on how students learn encouraged many in the sector to re-examine their teaching. Marton and Säljö (1976) found that students took different approaches to their learning and classified these as 'deep' and 'surface'. With 'deep' learning the student's intention was to understand the subject fully, considering their new knowledge in light of their existing knowledge and forming a changing conception of the world through their activities, i.e. constructing knowledge. In 'surface' learning, however, the students' intention was to memorise discrete pieces of information and repeat this in assessment situations in order to be successful and gain desired qualifications.

Other recent literature on student learning continues to promote constructivist approaches to teaching to prepare the student for 'a radically unknowable' world (Barnett, 2004:247). Shulman (2005) expresses the need to incorporate risk and anxiety into education to prepare students as citizens for the future and Bass and Elmendorf (2009) argue the importance of 'not knowing' in learning, believing that the emphasis should be on the learning process and not product. John Seeley Brown (2008) points out that the curriculum in HE is potentially stifling student

learning as he shows that student interest begins in practice and moves to content, whereas universities frequently start with content and attempt to generate interest. Jenkins et al (2006) also question the formal curriculum used by universities and consider a 'post course era'. Hodge et al (2007) recommend a 'student as scholar' approach (Hodge et al, 2007:3) where the student works in a 'discovery paradigm'; whilst Angela Brew (2007:7) suggests engaging students in research and enquiry and taking part in co-learning, with which Kuh (2008) agrees. Spronken-Smith and Hilton (2009) provide evidence to support the use of inquiry-based learning finding that students who followed a discovery orientated programme did better than those on more traditional programmes. Finally, Healey (2005:70) argues that students need to move from being the 'audience' to being 'participants' in their own learning.

Students' active involvement in their own learning therefore continues to be emphasised throughout the HE pedagogical literature.

2.4 Teachers' approaches to teaching

The work on student learning was instrumental in opening up the research on teachers' conceptions of teaching; however there is no general agreement about what conceptions of teaching are. The use of phenomenological methods dominated the early research with Fox (1983) making one of the first attempts to

identify factors involved in the conceptualisation of teaching. His results can be expressed in terms of clusters of characteristics that can be organised into qualitative dimensions describing two 'simple' theories of teaching, 'transferring knowledge' and 'shaping studies' and two 'developed' theories, 'travelling through a subject' and 'growing as a learner'. A 'building' theory also emerges as a hybrid of the 'simple' theories which could be construed as a bridge towards the 'developed' theories.

Research in this field has attempted to uncover teachers' approaches to teaching and Dall'Alba (1991) identified seven different ways in which teachers conceived of their teaching. She suggested there is a continuum of beliefs which has at one end teachers who believe their role is to present information; and moves on to teachers who believe they need to transmit information; to those who demonstrate the application of theory to practice; to developing ideas or developing the ability to be expert; then, moving towards the other end of the continuum, those who develop different perspectives of understanding; or finally to those who perceive teaching as bringing about conceptual change.

Gow and Kember (1993) built on the work of Dall'Alba (1991) using mainly phenomenographic research methods they identified two main types of approaches taken by teachers which they described as 'transmission of knowledge' or

'facilitation of learning'. With 'transmission of knowledge' it was the teachers' intention to transmit their subject knowledge to their students, which aligns most closely with objectivist approaches to teaching. With 'facilitation of learning' it was the teachers' intention to create learning opportunities and environments in which the student could develop their own understanding of their subject, which aligns most closely with constructivist approaches. Kember and Gow (1993) went further and developed a questionnaire from 39 semi-structured interviews in order to research these approaches more quantitatively, which was subsequently developed by others (e.g. Norton et al 2005; Richardson et al 2007).

Samuelowicz and Bain (1992) describe teachers' conceptions in terms of combinations of characteristics. They identified five conceptions of teaching: 1) imparting information; 2) transmitting information within a discipline framework; 3) facilitating understanding; 4) supporting student learning; and 5) changing students' conceptions of the world. Samuelowicz and Bain (1992) suggested that teachers may have 'ideal' and 'working' conceptions of teaching.

> 'It seems, from the limited data available, that the aims of teaching expressed by academic teachers coincide with the 'ideal' conception of teaching whereas their teaching practices, including assessment, reflect their 'working' conception of teaching. If this is the case research might profitably be directed towards the factors (teacher, student, institution-related) which prevent academic teachers from acting according to their ideal conception of teaching and thus contribute to solving one of the mysteries of higher education – the disjunction between the stated aims (promotion of critical thinking) and educational practice (unimaginative coverage of content and testing factual recall) so often referred to in the literature ……

(Samuelowicz and Bain 1992:110)

Prosser *et al* (1994) took a phenomenological approach in their study of teachers' conceptions and analysed the results in terms of 'referential' and 'structural' components. Structural components included information transmission, helping students acquire concepts, helping students develop conceptions, and helping students change conceptions. The referential components depend on the source or focus of knowledge, which could be the teacher, syllabus or student. Trigwell and Prosser (1996) went on to create the Approaches to Teaching Inventory (ATI) in an attempt to quantify data on university teachers' approaches to teaching. Their research identified a link similar to that in students' approaches to learning and found that teachers who took an 'Information transmission' approach were more 'teacher-focussed', i.e. they were more concerned with their own activities than how their students learned; and that teachers who took a 'conceptual change' approach were more student-focussed and cared more about how their students learnt. Teacher approaches which were student-focussed were also found to promote deep-learning approaches within students. Similarly, teacher approaches that were teacher-focussed promoted a surface-learning approach within students. The importance of the teachers' approach is seen therefore to have a direct impact on the quality of the students' learning experience.

> 'teachers who focus on their students and their students' learning tend to have students who focus on meaning and understanding in their studies, while university teachers who focus on themselves and what they are doing tend to have students who focus on reproduction.' (Prosser and Trigwell, 1999:142)

The understanding of teachers' approaches was further developed by Kember and Kwan (2000) who sub-divided conceptions of teaching. Knowledge Transmission teaching (or teacher-centred teaching) was extended to include teaching as imparting information, and teaching as transmission of knowledge but with a 'concern for student understanding'. Teaching as learning facilitation (or student-centred teaching) was further extended to include teaching as meeting students' learning needs, and teaching as helping students become independent learners.

In more recent literature, Cousin (2010) and others (Land et al, 2008; Meyer and Land, 2006; Lucas and Mladenovic, 2008) are critical of this phenomenographic tradition, preferring instead to focus upon the teachers' activity. This theory has been described as 'threshold concepts' in which the academic focuses on a problematic concept with which students struggle. This literature suggests that rather than focus on general education theory the teacher should instead provide an environment in which the student enters a 'liminal' space and that the teacher and student persist in a co-operative endeavour to develop the students' understanding. The emphasis is still on constructing knowledge therefore, although in this scenario the teacher does whatever is necessary to help the student learn, rather than be constrained by 'accepted' facilitative behaviours.

Whilst the literature has privileged the role of constructivism in student learning the HE sector has largely failed to adopt these methods within its practices. Windschitl (2002:142), for example points out that 'unfortunately the default epistemology of western schooling is objectivism'. Murray and Macdonald (1997), Barnett (1992b), Gibbs (1992) and Laurillard (2002) agree noting the dominance of objectivism in actual practice. Fetherston (2001) suggests that 'The unspoken assumption behind this approach is that delivery of the content results in learning of the material', implying that meaning is transferred at the same time as information. Where university teachers are aware of the dominance of constructivist thinking they may espouse its merit, but in practice may take more didactic approaches as outlined by Argyris & Schon (1978). So what university teachers say they believe and what they actually do may be two different things and the individuals concerned may not be aware of this difference.

Murray and MacDonald's (1997) research explored university teachers' conceptions of their roles including the purposes of lectures, tutorials and assessment. The main conceptions of teaching these lecturers had of their roles were to: impart knowledge; provide student support; enthuse and motivate students; facilitate student learning or some combination of these. The majority claimed to be student supporters or facilitators; however this was at odds with their practice. Their teaching and assessment illustrated that there was a dominant use of lectures and tutorials in which information was disseminated and where knowledge and

understanding was checked and applied – the claimed 'learning facilitation' was not in evidence.

Norton et al (2005) surveyed teachers at four universities in the UK and taking the broad orientations identified by Gow and Kember (1993) of 'learning facilitation' or 'knowledge transmission' and Trigwell and Prosser (1996) student-centred/ teacher-centred concepts, and set out to investigate whether teachers' beliefs and intentions (i.e. self-reported practices) were influenced by their institution, their academic discipline, the extent of their teaching experience and their 'exposure to formal training in teaching in higher education' (2005:543). They too discovered a disjunction between teachers' beliefs and intentions, with intentions being more orientated towards knowledge transmission than were their beliefs. They also found that 'problem solving' was associated with beliefs based on learning facilitation but with intentions based on knowledge transmission. The differences in teachers' intentions and between genders seemed to result from different conceptions of teaching. Whereas the differences in teachers' intentions across different universities and between teachers with varying levels of experience appear to have arisen from contextual factors. They believe that teachers' intentions therefore appear to be a compromise between their conception of teaching and their contexts.

Teachers' approaches to teaching appear to be informed by a number of different influences. The way in which the teacher was taught as a student may well be important, as is their discipline and pedagogical beliefs (Kreber, 2009). As already discussed, in many studies, the external and internal environment appears to have a significant role to play (Fanghanel, 2007). Doolittle (1999) suggests a continuum of theory-based beliefs, from a behaviourist orientation, to cognitive constructivism, to social constructivism and ultimately radical constructivism. Doolittle's model is based upon the understanding that teachers' beliefs are formed by a number of different experiences and are consequently unique to these individuals.

Posner et al (1982) suggest that teachers experience cognitive dissonance when they realise that their current teaching strategies are inadequate for the task at hand. This may cause them to disrupt their existing belief structures and replace them with new knowledge to regain coherence. Block and Hazelip (1995:27) believe that individuals are particularly resistant to changing their beliefs 'teacher beliefs and belief systems are grounded in their personal experiences and, hence, are highly resistant to change'. Beliefs are considered by many to be relatively fixed and guide decision-making activities and practices (Pajares, 1992; Prawatt, 1992; Richardson 1996) and Cuban (1990) suggests that policy-makers need to consider teachers' beliefs more carefully before attempting to impose any changes.

The conservative nature associated with teaching behaviour has been discussed by Lévi-Strauss (1974) who believed that teachers make intuitive choices of practices from those which align with their beliefs 'Practices which suit the person of the teacher become candidates for admission to his kit of regular behaviour and are then tried out' (Levi Strauss, 1974:79). Hargreaves (1978:77-78) also describes teachers' tendency to 'accommodate, rather than transcend, constraints on their work.' Denscombe (1982) supports this pointing out that teachers frequently react to constraints within their environment by behaving more conservatively. Huberman (1993, 1995) agrees that this conservative behaviour exists, but sees it as essentially pragmatic as it demands no radical alterations to existing practice. Hargreaves (1994) too believes that teachers are overly cautious when trying out new pedagogies. The implication is, then, that teachers frequently act without the guidance of a theoretical model or values and instead react to the teaching problems they encounter by adapting their current resources for use in new environments.

Changing individuals' beliefs however is an under-theorised area. Some teachers may be resistant to the efforts of staff developers because they construe that a deficit model is being taken of their current practice and Hatton warns against this

> 'For such teachers to consciously set about making changes in their existing teacher culture would be to erode these skills which they consider to constitute their competence.' (Hatton 1989:84)

Caravita and Hallden, (1994) suggest that teachers should not resist development activities but rather see these activities as extending their repertoire of ideological ideas and the means with which to refine their organisation and coherence. Jacobsen (2002) concurs seeing change dependent upon the teacher's capacity to 'build new bridges' but notes the importance of this occurring via constructivist learning experiences. Levin and Wadmany (2006) also suggest that holding multiple beliefs should not be regarded as conflicting but rather see them as potentially complementary.

> 'Such an interpretation of the multiple conceptions perspective confirms that learning and teaching are complex and multifaceted phenomena just like the environment with which learning individuals and communities interact.' (Levin and Wadmany, 2006:174)

Other university teachers may disagree with the pedagogical approach which is being endorsed, or they may consider that their role and identity are more firmly established as researchers and therefore teaching development is less critical to their career success and is given less priority in their career trajectory.

Clearly resistance to change is an important issue when one considers the considerable changes brought about to the university teachers' role in the expectation that they use online technology to support student learning. The specific literature on beliefs and online teaching practices will now, therefore, be considered.

2.5 Beliefs and online teaching practices

The use of new online technologies in higher education teaching has been growing rapidly in the last ten years. Consequently the research on the impact of teachers' beliefs on online practice has evolved as a new area of research. Frustration has been expressed at the failure of online learning (Albion, 1999; Albion and Ertmer, 2002; Scrimshaw, 2004; Lim & Khine, 2006) but the research on 'the relationship between technology integration practices and teacher beliefs [….] is limited' (Levin & Wadmany, 2006:158)

Judson (2006) found that teachers who had a student-centred approach were more likely to make use of new technologies in their teaching and those with a teacher-centred approach needed to make more changes to their practice in order to successfully integrate technology into their teaching. The influence of the teachers' existing pedagogical orientation is supported by Gobbo and Girardi (2002) who found that teachers' use of new technologies differed depending on their pedagogy, which was further corroborated by Becker (2000) who suggests that teachers with traditional pedagogical beliefs would use online environments to merely pass on information to students. Other studies (Fang, 1996; Yocum, 1996; Windschitl, 2002; Windschitl and Sahl 2002) have shown that teachers adopt new practices when the assumptions underlying the new practices align with their pedagogical beliefs and where this alignment does not exist new practices can be rejected. Cuban et al

(2001:830) concurs arguing that 'New technologies will, paradoxically, sustain old practices' and most recently this has been supported by Palak and Walls (2009:417) who found that

> '(a) teachers use technology most frequently for preparation, management, and administrative purposes; (b) teachers' use of technology to support student-centred practice is rare even among those who teach in technology-rich schools and hold student-centred beliefs; (c) teachers in technology-rich schools continue to use technology in ways that support their already existing teacher-centred instructional practices.'

Ertmer (2005) found mixed practices in online environments and the reasons teachers themselves gave for the inconsistencies between their beliefs and practices included these cultural constraints.

> 'Despite the fact that most of the teachers described themselves as having constructivist philosophies, they implemented technology in ways that might best be described as representing a mixed approach, at times engaging with their students in authentic, project based work, but at other times asking them to complete tutorials, practice skills, and learn isolated facts. Teachers' explanations for these inconsistencies often included references to contextual constraints, such as curricular requirements or social pressure exerted by parents, peers, or administrators.' (Ertmer, 2005:29)

Levin & Wadmany (2006) carried out a three-year longitudinal study of six school teachers analysing the impact on teachers' beliefs on their practices in using technology. Their findings revealed that teachers' beliefs changed substantively over time and suggest that teachers' beliefs are not necessarily fixed but can have a 'mosaic of complementary visions, even conflicting ones.'(p.157). This research revealed that teachers' practices could positively influence beliefs towards a more

student-centred approach, which is supported by Becker and Ravitz (1999) and Loveless et al (2006) who found that developmental experiences with technology could facilitate a change in teachers' epistemological beliefs leading to more facilitative roles in teaching. Thompson (1992) suggested that the assumption that beliefs are stable and influence practice may be only partially correct and Levin and Wadmany (2006) go further and challenge the connection suggesting that it may be a more dynamic, two-way, relationship. Muijs and Reynolds (2002) concur finding that beliefs were dynamic mental structures which could be changed by practical experience.

The literature suggests therefore that teachers are using online technologies to suit their existing pedagogical approaches, with the transfer of existing or preferred teaching practices continuing in online learning environments. However it is also found that developing new practices may help to develop and change beliefs leading to more sophisticated teaching practices.

2.6 Staff Development

The use of technology to support existing pedagogical approaches may have much to do with the way in which teacher development in this area has been conducted. The taken for granted assumption has frequently been that university teachers can teach. Gitterman and Germain (2008), for example, found that new teachers start

their teaching careers believing that subject expertise gives them the ability to teach. In such scenarios the introduction of new technology can focus upon the technology itself and the teacher can be assumed to have only technical needs, i.e. an understanding of how the new tools work and a supportive environment in which to learn this (Conole and Fill, 2005). Without addressing the underlying pedagogical beliefs held by university teachers it is unsurprising that teachers would merely continue with their usual practices. So if university teachers believe their role is to transmit information they will use the online environment to do this. Wang *et al* (2004) believed that online learning environments would not be effective in supporting student learning if their use was limited to supporting teachers' existing pedagogical beliefs. They perceived that until teachers' pedagogical beliefs were addressed students may continue to struggle in online learning environments.

Much of the staff development in this field has focussed on the use of the technology itself. The complexity of developing effective university teaching in online environments is illustrated by Lim & Chai (2008) who use Gibson's (1977) term of 'affordances' to extend the argument on beliefs. They show that understanding new technologies and what they are able to offer the teaching situation is important, but, even so, the teacher may not be able to utilise the tool. Teachers need more than just knowledge of the possibilities offered by new technologies but also an acceptance of the pedagogical principles underpinning the

recommended approaches and the appropriate wider environment in which to develop and carry out these new practices.

> 'Teachers may perceive a particular affordance of the computer tool, but their pedagogical beliefs, competencies and socio-cultural contexts, and objectives of the lesson may prevent that affordance from being attended to or taken up. That is, the perception of an affordance by teachers may not necessarily be taken up: but for an affordance to be taken up, it has to be perceived by teachers.'(Lim & Chai, 2008:2008)

The implication from this work is that university teachers have multiple needs. Staff development initiatives have recognised the need to explain the technology and demonstrate its use, yet the literature suggests the paramount importance of teachers' pedagogical beliefs on their teaching practices. Both forms of development are therefore necessary. Without a working knowledge of technologies, university teachers do not know the possibilities available to them. Without knowledge of the underpinning pedagogical design, and an alignment with this, the use of online learning environments may remain an under-utilised and ineffective resource in university teaching.

Interventionist strategies of staff development are frequently perceived to be the means with which to change staff behaviour and Dearing (1997) was hugely influential in focussing universities upon the need to develop their staff.

> 'The health of higher education depends entirely on its staff, whether academic, professional or administrative. [.....] Over the next 20 years, the roles of staff are likely to change, as they undertake different combinations

> of functions at different stages of their careers. To support and prepare staff for these new working patterns, more focused and appropriate training and staff development activities will be needed'. (NCIHE 1997: accessed online)

One of the recommendations which flowed from this was that new university teachers should receive training on accredited programmes; and/or gain membership of the Institute for Learning and Teaching in Higher Education, or, as it became, the Higher Education Academy (HEA).

> 'Recommendation 48
> We recommend to institutions that, over the medium term, it should become the normal requirement that all new full-time academic staff with teaching responsibilities are required to achieve at least associate membership of the Institute for Learning and Teaching in Higher Education, for the successful completion of probation.' (NCIHE, 1997: accessed online)

New university teachers are now expected to complete a programme of study preparing them for their teaching role (HEA, 2006). These programmes have been heavily influenced in recent years by research on student learning which is dominated by notions of constructivist principles. However, many university teachers are acculturated into teaching through their life's experience as students themselves and will often teach as they were taught, which was frequently in a traditional manner. Teacher development programmes based upon constructivist principles may, then, be at odds with the university teachers' expectations and thinking in this area, and in such circumstances constructivism can feel counter-intuitive. These concepts are difficult for many teachers to grasp and many

struggle, as Nespor (1987) points out the fundamental changes in worldview required for constructivist teaching are not easily realized: they are akin to conversation or gestalt shifts.

As part of their early years in teaching new university teachers often receive teacher development which is based upon constructivist approaches to teaching (Biggs and Tang, 2007; Fry et al, 2009; Ramsden, 2003; Race, 2006; Cowan, 2006; Light et al, 2009). How this is subsequently taken up however is largely unknown. Cohen (1990) found a 'pick-and-mix' approach to practice amongst teachers in the USA and noted the apparent contradictions that this created. Ultimately teachers appear to remain pragmatic and fall back on their intuition and previous experience in deciding what to do (Windschitl, 2002:151).

University teachers may also avoid 'innovative' teaching methods as constructivist approaches can be rejected by their students. Students who have been successful in rote learning situations and other more traditional settings can feel disorientated by new teaching methods how ever well intentioned. They may have preconceived ideas of what education and learning is and may initially reject any attempts to change this. Teachers who wish to explore constructivist pedagogies often experience barriers to their inception

> ‘ .. teachers who take this path must work harder, concentrate more, and embrace larger pedagogical responsibilities than if they only assigned text chapters and seatwork’ (Cohen, 1988:255)

The innovative teacher may also be regarded with suspicion by his/her peers and their wider university as didactic teaching cultures can be entrenched and it may be a pragmatic decision on the part of the individual teacher to comply with the cultural norms present in their institution and cope with the ambiguities this may create.

Many writers assume that teachers’ conceptions of teaching change with their growing experience moving towards a more student-centred orientation (see Dall’Alba 1981; Fox 1983; Kember 1997, 1998; Kugel 1993; Sherman *et al* 1987) although Norton et al (2005:556), found that experience appears to make little or no difference to the beliefs or conceptions held by university teachers. Other assumptions that have been made are that teachers in universities will benefit from formal training programmes (see, Brown and Bakhtar 1988; Sherman *et al.* 1987; Murray and MacDonald 1997, Gibbs and Coffey 2004) and many teachers in higher education can now participate (or may be required to participate) in formal institutional pedagogical development programmes. Ho (2000) developed a programme which attempted to change university teachers’ conceptions of teaching which she reported had encouraging early results and appeared to have an impact on the learning approaches adopted by the teacher’s students. Postareff et

al (2007) also found that university teachers were positively impacted by pedagogical training in terms of their student-centredness and self-efficacy.

Nevertheless there is also conflicting evidence that training has any effect on teaching behaviour (Dunkin 1990; Levinson-Rose and Menges 1981; Weimer and Lenze 1991; Muijs and Reynold, 2002; Levin and Wadmany, 2006). Frustratingly Gibbs (1995) and Trigwell (1995) report that some of those participating in such programmes modify student-centred approaches to more didactic methods. Consequently there is a growing call from many in the field (Bowden, 1989; Ramsden, 1992; Trigwell *et al* 2005; Entwistle and Walker 2000; Kember and Kwan, 2000; Putnam and Borko (1997); McAlpine and Weston (2000); Zhou & Xu, 2007) suggesting that genuine development will only occur by addressing teachers' underlying conceptions of teaching and learning. Fanghanel (2007) makes strategic recommendations for effective educational development namely that these different levels of practice should be acknowledged, and that there should be a degree of agency (individual response) given to participants.

2.7 Conclusion

This chapter has considered the research on learning in higher education and has identified the dominance of constructivism as the most widely accepted theory of how students' learn. Despite this widely accepted theory however it is also

acknowledged that many university teachers may be unaware of it in any expert sense and even where this knowledge exists teachers may be unable or unwilling to practice in this way.

The chapter has focussed upon the literature on teachers' conceptions of teaching and found many different theories in this field. Essentially, however, the theories distinguish between two main approaches to teaching, namely a learning facilitation approach which is student-centred in nature, in which the teacher designs their teaching around student activity and construction of knowledge and understanding; or a knowledge transmission approach which is teacher-centred in nature, in which the teacher designs their teaching around the content of the curriculum which is transferred to students in the belief that understanding is simultaneously transferred with information.

Teachers have been found to take the different approaches identified above and research has found that teachers' approaches can have a profound effect on student learning, i.e. teachers' who take a teacher-centred/knowledge transmission approach are more likely to have students who take a surface approach to their learning; and conversely teachers who take a student-centred/learning facilitation approach are more likely to have students who take a deep approach to their

learning. Deep learning approaches are associated with higher order conceptual skills that are believed to be necessary for students' ability as lifelong learners.

Government and institutions have enthusiastically adopted these technologies believing that they will assist in greater teaching efficiency and further support student learning; teaching staff, however, have been less enthusiastic about its use. Nevertheless the perception that online learning environments provide a means of efficient delivery of teaching materials persists and due to recent funding constraints the use of online technology appears likely to increase. Given this scenario online delivery may increasingly augment face-to-face delivery and the teaching that takes place there becomes more critical to the overall student experience. Developing university teachers' abilities to teach effectively using this medium therefore becomes ever more important.

Staff development in HE has become an established phenomenon of the university landscape. It can often be viewed as interventionist and a place in which remedial action is taken in order to 'correct' poor teaching practice. This functional area is focussed upon cultural change within the institution attempting to enhance teaching practice for the benefit of the student learning experience, attainment and retention.

Universities have clearly invested heavily in the new online technologies, but their academic teaching staff display a reluctance to engage with it. The remedy to staff reluctance in this area has often been an interventionist approach (Conole and Fill, 2005) to staff training and development in the affordances (Gibson, 1977) of the technology itself. However it is argued here that reference to the literature on teachers' beliefs and their impact on practice may be able to throw light on the reasons for low levels of take-up and successful use and provide insight into the necessary conditions for effective developmental programmes.

This thesis then will seek to uncover teachers' pedagogical beliefs and online teaching practices and assess their alignment, i.e. whether the beliefs they express correspond to their practices when teaching online. This will reveal what actually occurs when university teachers use online learning environments and identify gaps between beliefs and practices. In addition the research will seek to identify any variables or commentary that accounts for the gaps which are identified. Understanding this context will be essential in order to make appropriate recommendations for staff development in this field.

Chapter 3

Methodology

3.1 Introduction

This chapter sets out the methods used to measure university teachers' pedagogical beliefs and online teaching practices. It begins with an explanation of the purpose of this research and a justification of the largely quantitative approach taken. It describes the instrument used to measure pedagogical beliefs and online teaching practices, charting its development from the pilot study. It goes on to describe the two distinct groups of university teachers who were invited to participate in the research and analyses the ethical considerations included in this research. Finally it concludes with a formulation of the hypotheses for this study.

3.2 The purpose of this research

The literature review has shown that the research on teachers' pedagogical beliefs and teaching practices has developed since the 1990s to focus upon university teachers. With the massification of Higher Education (Trow, 1989) in the UK (and elsewhere) the role of the teacher has become an area of increasing focus, as with rising class sizes and a broader range of students, there are increasing demands on this position. The introduction of technology into this new HE landscape has added to the complexity of the teachers' role.

Governments have promoted the use of technology over the last fifteen years seeing its potential to cut the growing costs of Higher Education, whilst simultaneously preparing students for a more technological future. Consequently, there has been a sustained push to promote the use of technology, with huge investment in hardware and associated software, which has led to an increasing use of online environments to provide online or blended learning programmes (Richardson et al, 2007). There is little evidence, however, to suggest that this investment has led to sustained improvements in student learning and/or teaching efficiency in that time.

The reasons for the lack of sustained success are multiple and complex. It will be argued here, however, that the teachers' approach to teaching in online environments will be a contributory factor to this success or lack of it. The literature on approaches to teaching has shown that the teachers' approaches to teaching has an impact on the students' approaches to learning and, if this is indeed the case, teachers' pedagogical design of all teaching environments is considered vital to successful learning. Indeed, the importance of pedagogical design will become more critical if the use of online learning environments increases as a proportion of taught academic programmes in the future.

The purpose of this research then is to measure teachers' approaches to teaching in online learning environments. This analysis will be conducted by firstly ascertaining the teachers' beliefs about pedagogy and then move on to assess their teaching practices in online environments. Teachers' responses to these two conditions, i.e. beliefs and practices, can then be compared. Initially alignment will be measured, i.e. analysis which seeks to find similarities between the two conditions. Following this analysis differences between the two conditions will be analysed in an attempt to gauge the gap between the two conditions. This information will be a useful indication of current sector wide practice and through the use of multivariate analysis of variance it will be possible to ascertain the differences between the behaviours of different teaching groups. Further, these findings can subsequently be used to inform appropriate professional development within the sector.

3.3 Ontological position

As Wright Mills (1959) suggests research questions are frequently an intersection between biography and history. The author is a university teacher, working in a post-92 university in the north of England. Following a career in financial services, the author initially taught in the university's Business School, but pursued interests in online teaching and now works in the university's learning and teaching department. In this role there has been a growing awareness of university teachers' espoused pedagogical beliefs and the contrast between these and actual teaching

practice. The research question posed by this thesis, therefore, has a particular place in the author's biography and this interest has developed in line with the political and technological developments within the university sector in recent years. In particular the author was keen to understand whether the problems perceived within their home institution were common throughout the sector. The large body of literature in the field of online learning provided much advice and many useful models illustrating how online environments could be used, but there appeared to be little evidence that teachers were generally using online environments in pedagogically appropriate ways. Again the author's biography as a staff developer is key to the final stated aim of this research, i.e. to consider the implications of this research in terms of continuous professional development within this field.

As already shown, there is a history of both qualitative and quantitative research in this field and this research illustrated that many methods could be used to reveal the espoused theories of action and the theories-in-use of teachers. Marland (1995) comments that,

> 'implicit theories cannot be studied until they are first made explicit... asking teachers to articulate their implicit theories inevitably involves them in a process of discovery.... Finding appropriate and valid ways of making implicit theories explicit is therefore a major methodological challenge.'Marland (1995:133)

The implicit theories pertinent to this area of research have, to a large extent, already been made explicit in other research. The distinctions between learning facilitation/student-centred and knowledge transmission/teacher-centred have been principally established and it was not the authors' intention to re-examine this theory, but rather to use this theory to understand online teaching practices. This specific focus, in conjunction with the desire to explore whether this perceived phenomenon was a sector wide issue, lends itself to a scientific approach and allows for large numbers to be surveyed. In addition such a research design could help to distinguish between different groups of individuals to ascertain patterns of activity within them.

The use of a questionnaire was therefore seen as the most appropriate means to answer the research question and it was decided to adapt a published instrument designed by Norton et al (2005) that had quantified teachers' pedagogical beliefs and teaching practices in general teaching situations. This instrument had subsequently been used and modified (for example, Jelfs et al, 2007; and Richardson et al, 2007) and was found to be valid and reliable. Permission was therefore sought from the original authors and it was adapted for the purposes of the current research. Where an instrument is known to be valid and reliable, statistical analysis can be a valuable tool to analyse the practices within a community; further if an existing instrument were adapted for this survey it would enable comparisons to be drawn with previous research studies. The adaptations

made for this research focussed specifically on the aspects of teachers' online practices.

Qualitative data was also seen to be potentially useful in terms of gaining a more 'complete picture' (Denscombe, 2010:141) of the university teachers' lived experience of using online learning environments. The questionnaire was therefore designed to collect comments from the respondents on their experiences in addition to collecting their likert scale responses to specific questions about their beliefs and practices. It was hoped that this qualitative data would enhance understanding of the quantitative findings and increase the objectivity of the study. The question design and the assumptions behind questions could be more fully analysed where respondents were able to provide their own words and their own 'non-directed' commentary on the subject at hand. Nevertheless it is accepted that all research is influenced by the researcher and absolute objectivity is not possible. A large-scale analysis may also enable generalisations about online teaching practices to be drawn but a critical realist position has been taken which, unlike positivism, is more epistemologically cautious and accepts the limitations of what can be known through research. Realism accepts experimental falsification and so methodological enquiries such as quantitative analysis are acceptable provided the findings are treated with caution and seen as true in the context of their time and culture.

3.4 The questionnaire

The questionnaire used by this research has been informed by previous qualitative and quantitative research and, as mentioned above, a questionnaire designed by Norton et al (2005) was adapted for use in the current research. This questionnaire drew on Gow and Kember's (1993) distinctions between 'learning facilitation' and 'knowledge transmission' and incorporated the issues of 'student-centred' versus 'teacher-centred' teaching identified by Trigwell and Prosser (1996). The beliefs section of the original questionnaire was preserved and the practices questions were adapted to specifically focus on practice within online learning environments. (See appendix 4).

The 36 item questionnaire in this research is made up of 18 items on pedagogical beliefs and 18 items concerning online teaching practices. There are two items in key areas for both beliefs and practices that are added together in order to create a subset score. Each subset in beliefs is paired with a subset in practices. There are therefore 9 subsets in all grouped into two key areas, i.e. 'learning facilitation' or 'knowledge transmission'.

The five areas identified as 'learning facilitation' are, 'problem solving'; 'interactive teaching'; 'facilitative teaching'; 'pastoral interest'; and 'motivating students'. The four areas identified as 'knowledge transmission' are, 'imparting information';

'using media'; 'training for jobs' and 'knowledge of subject'. As stated, there are two items on each area in beliefs and two items on each in practices and these scores are added together in order to get a subset score. The only exception to this is 'facilitative teaching' where there is only one question in beliefs and one in practices. 'Learning facilitation' then, sees teachers as essentially holding constructivist views of learning, i.e. that the student is constructing their own knowledge through a process of activity and facilitation; whereas the teacher who takes a knowledge transmission approach is taking an objectivist approach to teaching, i.e. a belief that they possess knowledge which can be transferred, simultaneously with understanding, to their students.

Table 1 below provides the actual items that were used for pedagogical beliefs and online teaching practices. The order in which these were asked is denoted by the number next to it. Respondents were asked to rate their response to each item on a likert scale: Strongly disagree (1); disagree (2); undecided (3); agree (4); strongly agree (5).

Table 1: Beliefs and Practices Items.

LEARNING FACILITATION		
	Beliefs	**Practices**
Problem Solving	1. Higher education should convert students from secondary-school type learning (e.g. memorisation) into tertiary type (e.g. problem solving) 5. The most important skill graduates can develop is the ability to carry on learning when they leave higher education	35. I use online environments to teach my students how to use logical and rational thinking. 42. I use the online environment to teach my students how to analyse information critically
Interactive teaching	9. A good lecturer should incorporate student discussion as part of his/her teaching. 13. Lecturers should encourage participation from their students.	28. I spend more time in online environments directing discussion than giving information. 30. I get students to participate in online discussion as much as possible.
Facilitative teaching	8. Teaching is about providing an environment in which students are encouraged to do the learning themselves.	31. One of my principal aims in the VLE is to provide an environment in which students are helped to 'learn for themselves' rather than be taught.
Pastoral Interest	3. A good lecturer is one who recognises the personal needs of his/her students 7. Good lecturers should have a genuine interest in their students' well-being.	32. When using online learning environments I keep in touch with students' pastoral problems. 37. I use online environments to show that I am concerned with my students' well-being
Motivating Students	10. It is really important that a lecturer is able to enthuse his/her students. 12. A good lecturer is one who can motivate students to learn.	33. I use online environments to encourage my students to become self-motivated individuals. 40. In my online environment I spend much of my time trying to present subject material in a way which will stimulate the interests of students.

KNOWLEDGE TRANSMISSION		
	Beliefs	**Practices**
Training for jobs	2. The main aim of higher education should be to prepare students for their future careers. 14. An important function of higher education is to produce graduates for certain professions within the community.	36. I use online environments to ensure that by the end of their course my students will be well qualified in their particular subject. 41. I use the online environment to prepare students for the roles they will have when they leave the institution.
Use of media	15. Lecturers present information more effectively if audio-visual materials are used. 17. New technology is going to revolutionise teaching.	29. I use audio-visual stimuli in online environments. 44. I use online environments to expose my students to new technologies.
Imparting information	4. A good lecturer is one whose main role is to impart information to his/her students. 6. Teaching is about the transmission of knowledge.	34. I use the online environments to pass on what information I know to students. 39. Within the online environment I give as much information as possible to my students.
Knowledge of subject	11. It is fundamental that lecturers know the latest advances in knowledge related to their subject area. 16. A good lecturer has to be an expert in their subject matter.	38. To prepare for my online environment I spend a lot of time ensuring that I have a thorough knowledge of my subject. 43. For my online teaching I keep abreast of my field of knowledge all the time

In addition to the beliefs and practices items a number of other questions were asked (see full questionnaire at Appendix 4). These included the frequency of use of online learning environments (suggested by pilot sample); gender; age; subject taught; years teaching in HE; whether the respondent holds a teaching qualification; whether the respondent is a member of the Higher Education Academy; whether

the respondent has received any formal development in the use of online technologies; whether the respondent has received any formal development in teaching and learning practice; and the nature of the institution where the teacher works, i.e. in a Pre '92 or Post '92 institution. These questions allowed additional interrogation of the data in order that patterns of group activity could be observed. These questions were all informed by previous research (Norton et al, 2005; Jelfs et al 2007; Richardson et al 2007). The questionnaire also asked for details about the respondents' priorities in teaching and learning and online teaching as part of their role, asking whether they had a high, medium, low or non-existent priority. These questions were informed by previous research (Fanghanel 2007). Finally questions on respondents' personal and work use of technology were asked, seeking information about what technologies were used and their frequency of use (Lloyd and Albion, 2009)

3.5 Pilot Study

The pilot of the questionnaire took place in November 2009. It was sent to 36 colleagues in three universities who it was believed were representative of the general population of university teachers. Participants were asked to comment on the length of time to complete; ease of use; the wording of the questions; and the availability of 'comment' boxes.

The replies suggested that the questionnaire was sufficiently clear to test pedagogical beliefs and online teaching practices. Suggestions made to improve the questionnaire included: to break up the lists of questions, so that they did not appear as long; provide a question on frequency of use and in particular to allow those who do not use online learning environments to skip the 'Practices' questions; and to include questions as to the breadth of usage of technology. The questionnaire was subsequently amended and the adapted version was used for the surveys which followed.

3.6 Respondents

The Higher Education Funding Council for England (HEFCE) launched the National Teaching Fellowship Scheme (NTFS) in 2000. The intention of this scheme was to raise the status of learning and teaching within universities. It recognises and rewards excellent teaching practice and provides monetary rewards that enable successful applicants to take part in specific learning and teaching related projects. Bill Rammell, Minister for Lifelong Learning, expressed the governments' vision of NTFS in 2006:

> The Government is committed to ensuring that all students get the quality of teaching they deserve. The National Teaching Fellowships recognise teachers' innovation and dedication and provide funding for them to spread their good practice and be champions of excellence." (HEA, 2006:1)

National Teaching Fellows (NTF) are, therefore, seen to be excellent teachers (HEA, 2010), and consequently denominated in this study as 'expert teachers'. In their claim for NTF status applicants describe and justify their teaching practice and support this with evidence from students, peers and other relevant parties. As these individuals have been found to be capable of presenting a clear pedagogical rationale for their practice and have been able to support these claims with supporting testimonials and other appropriate evidence they can be identified as an example of the sort of practitioners extolled by the HE sector. As has already been argued, the prevailing literature in the field of learning and teaching in higher education is dominated by the theories of constructivism and learning facilitation. It was, therefore, considered useful to compare NTF online teaching practices with those of other university teachers who had no expert teacher status, denominated in this study as 'non-expert'. The assumption here is that the expert teacher group would have pedagogical beliefs grounded in constructivism and that these teachers have been able and willing to enact these beliefs when teaching in online environments. It was assumed therefore that their beliefs and practices would be aligned and that this was a necessary condition for effective teaching.

The terms of 'expert' and 'non-expert' used in this thesis need additional clarification at this stage. These terms have been used as monikas to distinguish between university teachers who have received a national award by the HEA for their expertise in online teaching and all other university teachers who have not

received this award. It could be argued that many university teachers could, if they so chose or were so nominated, put themselves forward for the NTF scheme and be successful in being recognised as 'expert'. Many teachers however, for a variety of reasons, may choose not to become involved in such schemes, but because of the means of classification used in the present study would be identified as 'non-experts' here. This is clearly a limitation of this study.

The use of the NTFS as a means of differentiating between expert and non-expert teachers is therefore problematic. The thesis uses these terms as handles to distinguish between these two groups and makes no attempt to consider the nature of talent or the origins of the expertise. Berliner (2001) identifies a distinction between expert teachers and 'successful' teachers which helps to illuminate these potentially misleading terms. In the present study it can be seen that NTFs could more accurately be described as 'successful' in receiving national acclaim for their practice; which more clearly identifies the origin of their expertise, i.e. from a competitive proposal.

The NTF scheme determines expertise through the completion of an application which asks applicants about their teaching practice. This application requires the applicant to provide evidence to support the claims made by providing testimonials and other substantiation from students, peers, managers, professional bodies and

others. Expertise then needs to be perceived by those judging the scheme and the criteria used for this process could be criticised as subjective and consequently flawed in its analysis. Culture and expectation clearly have a big role to play in determining who is considered expert and who not (Sternberg and Frensch, 1992) and as a result those applications which chime most closely with the prevailing attitudes of the day are most likely to be successful. The study's description of 'expert' therefore relies solely upon the judgement of HEA assessors and the willingness to participate, skills and time to complete and commitment to the process of effecting the necessary documentation for these claims, of those who put themselves forward, or are put forward by their universities. This judgement is further exacerbated in that assessors will inevitably have different backgrounds, disciplines and perspectives on learning and teaching. It is necessary therefore to acknowledge the subjective nature of the NTF scheme and recognise potentially misleading use of such terms as expert/non-expert. Neither the assessors of the NTF scheme nor the successful applicants can be considered a homogenous group.

The Higher Education Academy website lists a group of 63 NTF acclaimed for their use of online learning environments (HEA, 2009). It was felt that the NTFS provided a coherent and discrete group of teachers whose practice could be usefully compared to others. In order to maximise NTF participation those listed were approached by telephone in the first instance in order to generate interest in the study and seek their co-operation to take part.

The attempt to compare 'expert' and 'non-expert' teacher groups provides a methodological problem, however. As stated there are only 63 UK university teachers recognised as 'experts' who could potentially take part in this survey, whereas there are many thousand 'non-expert' university teachers. This imbalance in numbers means that a genuine comparison between these groups may be difficult to achieve and this limitation should be acknowledged. Nevertheless it would still be possible to compare groups within each separate sample and through the use of appropriate statistical tests draw findings. It is generally acceptable to use parametric statistics for large samples and it is therefore necessary to justify the appropriate use of all tests in the smaller sample.

As Sharp (2009) points out it is most important to research the group who are more representative of the university teaching population, i.e. 'non-expert' practitioners who may, or may not, use online technology as part of their teaching. It is also this group of 'non-expert' teachers that the author was most interested in studying, as it is their practice which will be impacting upon the majority of students and in terms of recommending strategies for future staff development this was the key group which needed to be understood. The group of practitioner 'non-experts' then are university teachers who may, or may not, use online learning environments and have no expert teacher status.

The questionnaire was then electronically sent to the two groups of university teachers in December 2009. The NTF were contacted directly and non-expert university teachers were identified and contacted through networks of 'distributors'. The distributors were groups with whom the author had an association, such as learning and teaching organisations, online learning groups, business and management groups, existing and former colleagues. The email to distributors (appendix 1) included an attachment, which was a second email to be distributed to their academic colleagues (see appendix 2). This email contained a link to www.surveymonkey.com that took them directly to the survey. The survey opened on the 4th December 2009 and closed on the 11th January 2010.

The networks which were exploited as distribution channels were HELF, BMAF, and others. HELF is the 'Heads of E-Learning Forum', a UK wide group for individuals who hold positions as leaders, or co-ordinators, of online learning within their respective universities. BMAF is the Business, Management and Finance Learning and Teaching Support Network associated with the Higher Education Academy. The assistance of these individuals was sought to distribute the questionnaire within their institutions and they were prompted after two weeks to maximise participation in the survey.

This timeframe for completion of the survey was deliberate in that the period before Christmas and immediately afterwards was perceived to be a quieter time of the academic year. By indicating a short time period for completion there may also be more impetus on behalf of the potential respondent to complete it without delay. Potential participants and distributors were also offered an incentive to take part in this research. All distributors and respondents could enter into a prize draw for an Apple iPod Touch on completion of the questionnaire. It was hoped that this would maximise early returns as it was believed that this prize would be perceived as a desirable object (see for example, Baker, 2009). It is accepted that the iPod Touch may have had more appeal to younger participants or those who enjoy using technology and in using such a prize as an incentive it may have created a bias amongst respondents. However it could equally be argued that those interested in technology may have already possessed such items and so the prize may have lacked appeal. The data required to award the incentive was stored in a separate database which respondents were redirected to on completion of the survey. Storing this personal information in a separate database was a deliberate device to separate individuals from their responses and preserve their anonymity.

As Cobanoglu and Cobaboglu (2003:486) point out 'Incentives need to encourage but not affect the responses.' To this end the survey was designed so that, on the majority of pages, respondents had to answer all questions before they could move on – this may have been tedious to a respondent only taking part in order to enter

the prize draw and it was hoped that they would exit the survey once this was realised. Nevertheless it is a matter of concern that the prize may have adversely affected responses. Hornik (1981:243) found however that 'perceived short completion time stimulates a heavier, more immediate response but does not produce noticeable changes in response quality and bias'. Other research has found that the inclusion of an incentive actually improves data quality in terms of its completeness, accuracy and comments to open-ended questions (James and Bolstein, 1990; Willimack et al 1995 and Shettle and Mooney 1999).

The online survey was stored on Survey Monkey at www.surveymonkey.com. An online electronic survey was used for a number of reasons, some practical and some ethical. The practical reasons were that an online survey is easier to use and distribute and following completion it is easier to transfer data into Excel and an SPSS database. Online surveys also allow collection of data while guaranteeing participant anonymity. Another advantage of using an electronic survey is that it can be designed to 'require' answers before the respondent can move on. This feature helps considerably to ensure there is no missing data in completed questionnaires and was utilised in the current study. However this could have the disadvantage of requiring answers to questions which do not offer an appropriate 'answer' with which the respondent feels they agree. For this reason most of the questions used provided a scale of responses and where appropriate 'Don't know' options.

3.7 Analysis of qualitative data

As stated, the main means of analysis used in this investigation is quantitative. However, it was appreciated that the use of 'open boxes' within the questionnaire may provide other, potentially rich, data which may illuminate the replies given by respondents. This data could be used to support or refute the findings elsewhere but, as the data was randomly supplied by participants as they felt appropriate, it could not be analysed in any systematic way, such as would occur where responses were generated from interviews or focus groups to specific questions. This data was therefore considered carefully, noting its position within the questionnaire and general themes were identified from this commentary to gain an overall understanding of the points made. The number of comments made in each identified theme was quantified to gain an understanding of the potential strength of feeling and this information along with chosen quotes is provided in order to illustrate the points made.

The addition of qualitative data can help to add further insight into the experiences of university teachers. The main intent of the survey is to establish whether pedagogical beliefs and online teaching practices are aligned, and the size of any gap between them, which clearly lends itself to a quantitative approach. However, the reasons for this gap could not be considered without some qualitative input.

The addition of the qualitative analysis therefore begins to explore the reasons why this gap may exist and provokes deeper considerations of the future strategies needed to develop practice within the sector.

3.8 Ethical Considerations

The decision to offer an incentive in order to maximise participation in this research clearly had ethical considerations. The incentive of entry into a prize draw for an Apple iPod Touch was offered to the 'distributors', i.e. individuals who work in universities and act as 'gatekeepers' to a large number of academic staff; and secondly the NTF and non-expert academic staff themselves who may have little or no intrinsic interest, or inclination to complete such a survey.

An email was sent to the identified 'distributors' asking them to forward an attached email, with an embedded hyperlink in it to academic staff in their universities (see appendix 1). Distributors then replied to the authors' email to confirm they had forwarded this email and in so doing were entered into the prize draw. It is appreciated that the email may not have actually been forwarded but the distributors honesty was relied upon and it was hoped that this demonstration of trust would be reciprocated. As Macfalane (2009:43) points out 'The importance of researchers demonstrating trust, truthfulness, or honesty may be found in most research codes'. The 'distributors', did not provide any confidential information in

carrying out this activity. Their colleagues, within their institutions could then choose to ignore, delete, or complete the questionnaire. It was clear that the email was a request for help from a researcher external to their university and their participation or lack of it, was unknown to anyone (see appendix 2).

It is asserted that these particular incentives were not problematic as, using Grant and Sugarman's (2004) analysis: there is no dependency relationship between the subject and the researcher; there are no high risks; the research is not degrading; the subjects are not only consenting because the incentive is so large to overcome their aversion to the study; nor is their aversion on principle (Grant and Sugarman, 2004:717). If the subjects believed any of the above to be true they could have simply refused to take part in the research. The decision to offer an incentive for completion of the questionnaire came about through the desire to get as many responses as possible in the shortest amount of time. Monetary rewards have been found to increase response rates (Bentley and Thacker, 2004; Edwards *et al*, 2005) and Willimack *et al* (1995) found that non-monetary incentives also had a positive effect on participation. Although the prizes were not cash prizes they did have a monetary value of around £150 each.

The offer of an incentive therefore was an intentional device to appeal to individuals to enter into a 'trade', where they may be rewarded for giving their time.

> '… the person offering the incentive means to make one choice more attractive to the person responding to the incentive than any other alternative. Both parties stand to gain from the resulting choice. In effect, it is a form of trade, and as such, it meets certain ethical requirements by definition. A trade involves voluntary action by all parties concerned to bring about a result that is beneficial to all parties concerned. If these conditions were not met, the trade would simply not occur. And as inducements in a voluntary transaction, incentives certainly have the moral high ground over coercion as an alternative.' Grant (2002:111)

The British Educational Research Association's (BERA) revised ethical guidelines (2004) recommend that in order to build trust between researcher and participant it is necessary to gain informed consent. To this end an invitation email was sent to all potential participants explaining the purpose of the study. This allowed potential participants to make a choice as to whether to continue (see appendix 3).

In addition to the above there is a concern over the use that may be made of this research which also has ethical considerations. An aim of the research is to influence practice and to develop appropriate development events. Kemmis (1993) argues however that research itself is a social practice which like other social practices contributes to and serves bureaucracy. These research findings could, for example, be considered to highlight 'unacceptable' practice and it is not the

author's intention that this information be taken out of context in order to force new teaching practices. In all publications it would therefore be necessary to make explicit statements so that a deficit model of the teacher did not arise from this work.

Bryman (2004, p.509) cites Diener and Crandall's (1978) work in which they group ethical concerns into four main areas, namely: harm to participants; lack of informed consent; invasion of privacy and deception. It is a matter of concern that the dominant managerial discourse which exists in many universities has created deficit models of both students and teachers and the author would not want this research to be used to further control or constrain the teacher. The concern then is with harm to participants, not in the immediate aftermath of this study, or necessarily to the participants as individuals, but to university teachers in general. There is a growing distrust of management within universities and this research may be used as part of the landscape upon which policy makers determine future strategies for university teachers, possibly taking it out of context and using it to further promote a deficit model of teachers. Sachs (2001) comments upon the rise of managerialism within teaching in Australia and reports that the profession is a rapidly changing environment where teachers have lost autonomy and become greatly restricted by government diktat as to what they should be doing in their classrooms, 'the time has now long gone when isolated unaccountable professionals made curriculum and pedagogical decisions alone without reference

to the outside world' (Sachs , 2001:158). This situation can also be seen in the UK and it will be necessary to make very clear statements in any research outcomes about the systemic causes of behaviour within universities.

3.8 Conclusion and Hypotheses

This chapter has outlined the purpose of this study, namely to assess university teachers' online teaching practices and compare these practices with their pedagogical beliefs in order to measure their approaches to teaching. It has explained the authors' place in this research and illustrated the origin of the research question.

The methods to be used in the study have been described and the development of the primary instrument has been explained. The two groups of respondents approached in this study have been detailed and the ethical considerations of this enquiry have been discussed.

To reiterate, the research objectives of this study are:

1. To discover whether university teachers' pedagogical beliefs are consistent (i.e. aligned) with their online teaching practices;

2. To compare the degree of alignment between 'expert' teachers' pedagogical beliefs and online teaching practices with the alignment of 'non-expert' university teachers' pedagogical beliefs and online teaching practices;
3. To identify the reasons for any differences between pedagogical beliefs and online teaching practices; and finally
4. To consider the implications of the research findings in terms of appropriate professional development in this field.

The literature has shown that university teachers frequently express beliefs in learning facilitation/ student-centred learning and yet, when their practices are compared with these espoused beliefs a disjunction or gap is found between what they believe and what they do. It has been assumed that expert teachers are more likely to have aligned beliefs and practices, because they have justified their pedagogical approaches to a national awarding body (HEA) and have been able to provide evidence, such as testimonials, from their students, peers and others to support their claims for excellence. The assumption that has been made here is that they must be able to practice what they preach. The author's own observations of online teaching practice has led to an expectation that a gap will be found between pedagogical beliefs and online teaching practices similar to the disjunctions found in more traditional teaching settings and that expert teachers will, therefore, have smaller gaps between their beliefs and practices than non-expert teachers.

Thus the literature along with the authors' own observations have led to the following hypotheses:

H_1
Expert teachers' pedagogical beliefs and online teaching practices will be more closely aligned than non-expert teachers' pedagogical beliefs and online teaching practices.

H_2
A 'gap' will be found between non-expert teachers' pedagogical beliefs and online teaching practices and this gap will be larger than the gap between expert teachers' pedagogical beliefs and online teaching practices.

A review of the role of professional development in this field will also be conducted in light of the findings of this study and recommendations made.

CHAPTER 4

Analysis of data: Non-Expert teacher group

4.1 Introduction

This chapter provides detailed analyses of the findings from the online survey completed by the 'non-expert' group of university teachers. This first group analysis comprises responses from 529 university teachers from across the UK who have no specialist teacher status. In the next chapter (6) the second analysis considers responses, against the same survey, made by 32 National Teaching Fellows (NTF) who are considered to be expert teachers in online learning environments; this group is consequently labelled 'expert'.

It is known from email details provided by respondents that 54 UK HEIs are represented in this study. There are 115 universities in the UK which form the bulk of the 165 HEIs (Universities UK, 2010). As such it can be seen that approximately a third of the universities in the UK are represented here.

Chapters 4 and 5 begin by describing the characteristics of the group in terms of the independent variables of the sample, namely: gender; age range; years teaching range; whether or not the respondent has a teaching qualification; whether or not

the respondent is a member of the Higher Education Academy; whether they have received any online development/training; whether they have received any general teaching and learning development; whether they teach in a Pre ’92 university or a Post ’92 university and finally a categorisation of the subject they teach (after Biglan, 1973).

4.2 Hypotheses

The following hypotheses have been generated. Table 2 identifies how each hypothesis will be interrogated.

Table 2: Hypotheses and interrogating statistical technique

Hypothesis	Interrogating Statistical technique
H_1 Expert teachers’ pedagogical beliefs and online teaching practices will be more closely aligned than non-expert teachers’ pedagogical beliefs and online teaching practices.	Pearson product-moment coefficient (*r*); Factor analysis
H_2 A ‘gap’ will be found between non-expert teachers’ pedagogical beliefs and online teaching practices and this gap will be larger than the gap between expert teachers’ pedagogical beliefs and online teaching practices.	Paired sample t-tests; Multivariate analysis of variance (MANOVA)

4.3 Characteristics of 'Non-expert' sample

The survey of non-expert teachers was attempted by 634 respondents of which 551 completed all questions relevant to their experience. Of the 551, 529 respondents answered all belief and practice questions, as 22 participants did not use online environments as part of their teaching. The analysis which follows considers only those who answered all belief and practice questions.

Table 3: Gender

	Actual	Percentage
Male	274	51.8%
Female	255	48.2%
Total	529	100%

Table 4: Age and Years Teaching in Higher Education

	Minimum	Maximum	Average
Age	24	72	45.3
Years in Teaching	0	42	11.85

Table 5: Other Staff development variables

	Yes		No		Not Stated		TOTALS
	Actual	%	Actual	%	Actual	%	
Teaching Qualification	304	57.5%	225	42.5%			100%
HEA Membership	186	35.2%	336	63.5%	7	1.3%	100%
Online Development	283	53%	246	47%			100%
L&T Development	429	81.1%	100	18.9%			100%

Table 6: Pre/Post 92 University

	Actual	Percentage
Pre '92 University	224	42.3%
Post '92 university	272	51.4%
Not Stated	33	6.2%
Total	529	100%

Table 7: Subject Taught (Discipline) after (Biglan 1973)

	Actual	Percentage
Unknown	8	1.5%
Hard Pure discipline area	42	7.9%
Soft Pure discipline area	95	18%
Hard Applied discipline area	100	18.9%
Soft Applied discipline area	284	53.7%
Total	529	100%

Table 8: Frequency of use

	Actual	Percentage
Daily	183	34.6%
Weekly	236	44.6%
Fortnightly	29	5.5%
Monthly	31	5.8%
Rarely	50	9.45
Total	529	100%

4.4 Descriptive Statistics

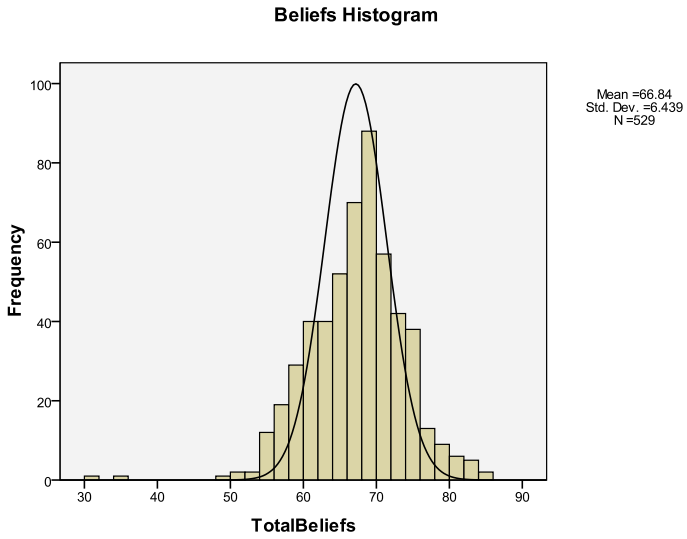
In order to screen the continuous variables for normality the survey data were checked for any violations of the assumptions underlying the statistical techniques to be used in the present study (Pallant, 2005). The mean number for Beliefs and Practices were 66.84 and 53.27 respectively, which suggests that beliefs might be more strongly held than practices. The standard deviation (SD) for Beliefs is 6.44 compared to the SD for Practices of 11.43 which suggests there are larger

differences in the range of scores given to the practices questions than the beliefs questions. (Appendix 5) The 95% confidence limits show that the population mean difference in Beliefs scores would be between 66.29 and 67.39; whereas the 95% confidence limits show that the population mean difference for Practices would be between 52.30 and 54.25.

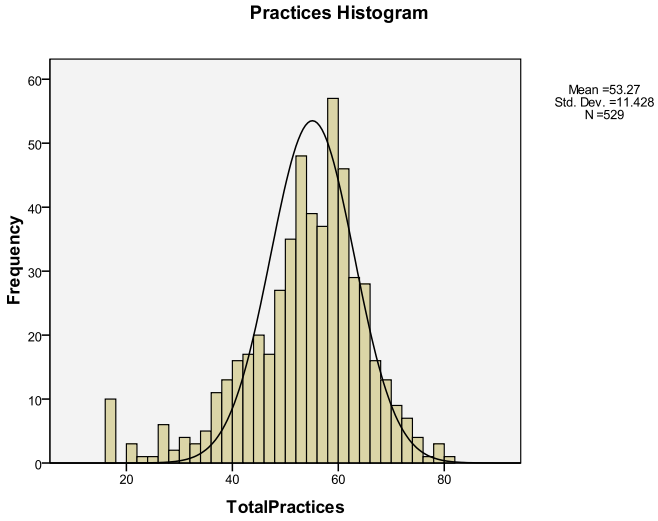
The distribution of the scores on the continuous variables of beliefs and practices scores were assessed using skewness and kurtosis and the results can be seen in Appendix 5. As can be seen the skewness value, which provides information on the symmetry of the distribution, has a negative value in Beliefs (-.509) and Practices (-.873) which suggests that scores are clustered at the high-end of the scale. The kurtosis values provide information on the 'peakedness' of the distribution. The kurtosis figures for Beliefs and Practices are 2.426 and 1.162 respectively which may indicate that the distribution is clustered in the centre. Tabachnick and Fidell (2007:80) suggest that any problems with skewness and kurtosis may be overcome in large samples. 'In a large sample, a variable with statistically significant skewness often does not deviate enough from normality to make a substantive difference in the analysis…. In a large sample, the impact of departure from zero kurtosis also diminishes.' The Kolmogorov-Smirnov statistic shows a sig. value of $p<0.001$ (Appendix 6). As a non-significant result indicates normality in this particular test, it can be seen that the assumption of normality has been violated here; this is however quite common in large samples (Pallant, 2005:57). Histograms were

consequently prepared for a visual interpretation of normality. The histograms provided below provide confirmation that both scales appear to be relatively normal.

Graph 1: Assessing the normative distribution of replies to BELIEFS questions



Graph 2: Assessing the normative distribution of responses to PRACTICES questions



4.5 Defining Subsets

There are 18 'Belief' items paired with 18 'Practice' items. These form nine subsets in 'Beliefs' and nine corresponding or paired subsets in 'Practices'. There are two items for each subset and so the scores were added together (e.g. 2 x problem solving questions, 2 x imparting information questions and so on) so that a cumulative score could be obtained for each subscale. As there was only one question for 'Facilitative teaching' this score was doubled in order to ease comparisons of variables from this point forward.

4.6 BELIEFS SCORES: Range, Mean and Standard Deviations

The minimum, maximum scores for all Beliefs ranged from 2 to 10, apart from 'Knowledge of Subject which ranged from 3 to 10 (Appendix 7). The strongest held beliefs, as defined by highest mean score, are in: interactive teaching (9.06);

facilitative teaching (8.91); motivating students (8.92); problem solving (8.78); and pastoral interest (8.21), i.e. LEARNING FACILITATION (LF). The mean scores for all other beliefs are lower, these being: knowledge of subject (7.84); training for jobs (6.88); using media (6.68); and imparting knowledge (6.02), i.e. KNOWLEDGE TRANSMISSION (KT). This implies that respondents generally have more strongly held beliefs about 'Learning Facilitation'.

The standard deviation (SD) also suggests that respondents more generally share 'Learning Facilitation' (LF) Beliefs than Knowledge Transfer (KT) beliefs, with the largest SDs seen in the KT items, with the lowest SD here in 'Knowledge of Subject' (1.42) and the largest SD seen in 'Imparting Information (1.98). The SDs are all lower in the LF items with the largest SD being 'Pastoral Interest' (1.36) and the lowest SD in 'Interactive teaching' (1.10). This shows that respondents are generally more agreed on LF subsets and less so on KT items although the differences are quite small.

4.7 PRACTICES SCORES: Range, Mean and Standard Deviations

The range of scores for all items was 2 and 10 respectively (Appendix 7). The mean scores for PRACTICES, are generally smaller than the mean scores for BELIEFS (see Appendix 7). The most commonly used PRACTICES, as defined by highest mean score, are in: 'Facilitative teaching' (7.52); 'Motivating students' (7.16); and

'Knowledge of subject' (6.99). The mean scores for all other practices are lower, these being: 'Imparting information' (6.75); 'Using media' (6.23); 'Problem solving' (6.16); 'Training for Jobs' (5.98); 'Pastoral interest' (5.19); and finally 'Interactive teaching' (5.05). This illustrates that, unlike in Beliefs, there is no grouping of LF and KT subsets along which respondents practice. This comparison of mean scores therefore suggests that there is little alignment between non-expert university teachers' beliefs and practices in online environments. Interestingly, for example, whilst teachers hold strong beliefs in interactive teaching (9.06) they do not practice this in online environments (5.05); they also hold strong beliefs in Problem Solving (8.78) but are less inclined to practice this online (6.16); and whilst Pastoral Interest is clearly an important belief (8.21) online environments are not the place in which this belief is widely practiced (5.19).

Mean scores are more closely aligned in the KT elements of the questionnaire, which is similar to Murray and Macdonald's (1997) findings. For example 'Training for jobs' (Belief 6.88, Practice 5.98); 'Using media (Belief 6.68, Practice 6.23); and 'Knowledge of subject' (Belief 7.84, Practice 6.99). With 'Imparting knowledge' the Belief score, 6.02, is actually exceeded by the Practice score, 6.75; this is the only item on which this occurs. So whilst it is apparent that university teachers clearly consider KT beliefs are less important than LF beliefs, they generally appear to be more agreed on their use in online environments.

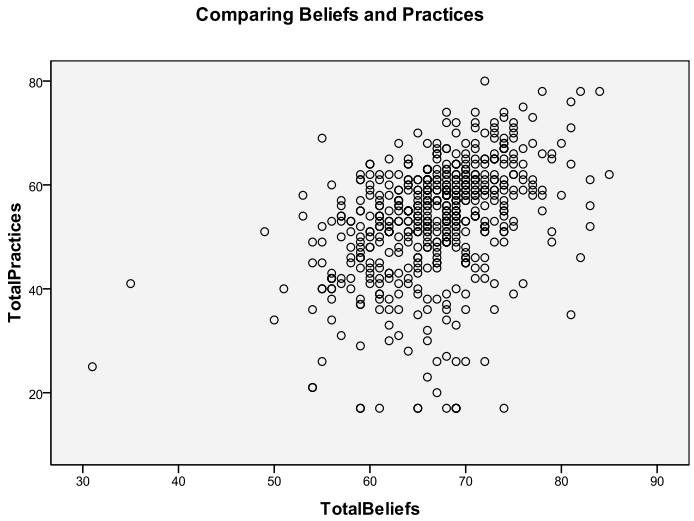
The SD found in the Practices responses shows that the large differences in respondents' scores exist in both LF and KT items. The SD shows that the differences in respondents' scores for the KT items are generally lower than the LF items, which again suggests greater general agreement about these items. The highest SD in the KT items is 'Using media' (1.96) and the lowest SD is 'Training for jobs' (1.79). This analysis shows that respondents are more in agreement about LF beliefs than KT beliefs. Conversely they are more in agreement about KT online practices than LF online practices.

As this study is seeking to identify the alignment between beliefs and practices scores a Pearson product-moment correlation analysis (*r*) was conducted. This test assesses the strength and direction of the linear relationship between beliefs and practices and provides information on the relatedness of the variables and is 'the most frequently used measure of association and the basis of multivariate calculations' (Tabachnick and Fidell, 2007:56). This test also analyses the significance of this relationship allowing the researcher to assess any predictability between scores.

4.8 Pearson product-moment correlation coefficient analysis

The scores for beliefs and practices were plotted on a scattergram seen in Graph 3 below. Beliefs can be found on the x axis and practices on the y axis.

Graph 3 Scattergram of Beliefs and Practices



The scattergram provides a visual summary of the relationship between the subsets. Each respondent is represented by one point on the scattergram. An imperfect positive relationship can be seen between beliefs and practices, with a discernible pattern of points going from bottom left to top right of the graph. This suggests that there is a positive relationship between beliefs and practices with high scores on beliefs subsets tending to be associated with high scores on practices subsets.

The Pearson product-moment correlation *(r)* can be seen in Table 9. This test provides information on the strength and direction of the linear relationship between the beliefs and practices variables. The absolute value indicates the strength of the relationship and the minus (–) or plus (+) signs indicate whether the

relationship is a positive or negative one, i.e. whether the variables are related in the same direction (+) or move in opposite directions (-). As non-expert teachers online teaching practices were unknown no directions were predicted and so a two-tailed test of significance was used.

Table 9 shows how beliefs and practices are related. Cohen (1988) suggests that a correlation of r=0.10 to -0.29 could be interpreted as 'small', whereas a 'medium' correlation is r=0.30-0.49, and a large correlation is r=0.50-1.0. The correlation table shows that Beliefs and Practices correlations are small in most subsets, showing few alignments between beliefs and online practices. The subsets which have a medium correlation are 'Training for Jobs'(r=0.354, p<0.001), 'Using Media' (r= 0.327, p<0.001), and 'Knowledge of Subject' (r=0.323, p<0.001); all identified as KT items in the original research (Gow and Kember, 1993). The implication is that beliefs in these areas, although not as strongly held as other beliefs, are at least more consistent in their scores and therefore more aligned to online practice. If these subsets do identify KT approaches then it could be said that online learning environments are being used in practice to objectify knowledge, pursuing a largely teacher-centred, knowledge transmission approach.

Table 9: Correlation between Beliefs and Practice subsets for non-expert teachers

Knowledge Transfer / Teacher-centred items shown in shaded boxes

		PRACTICES								
BELIEFS		**Prob. Solv.**	**Inter-active Teach**	**Facilit-ative Teach**	**Pastoral Interest**	**Motiva-ting Studs**	**Training for jobs**	**Using Media**	**Impart. Info.**	**Know. of Sub**
Problem Solving	Pearson Correlation	.102*	.092*	.169**	.115**	.184**	.151**	.120**	.042	.114**
	Sig. (2-tail)	.019	.034	.000	.008	.000	.001	.006	.339	.009
Interactive Teaching	Pearson Correlation	.128**	.202**	.235**	.165**	.261**	.175**	.215**	.056	.213**
	Sig. (2-tail)	.003	.000	.000	.000	.000	.000	.000	.199	.000
Facilitative Teaching	Pearson Correlation	.097*	.120**	.250**	.006	.139**	.108*	.124**	-.010	.069
	Sig. (2-tail)	.026	.006	.000	.891	.001	.013	.004	.810	.114
Pastoral Interest	Pearson Correlation	.154**	.182**	.179**	.270**	.288**	.221**	.211**	.197**	.233**
	Sig. (2-tail)	.000	.000	.000	.000	.000	.000	.000	.000	.000
Motivating Students	Pearson Correlation	.123**	.090*	.168**	.164**	.239**	.188**	.158**	.123**	.194**
	Sig. (2-tail)	.005	.038	.000	.000	.000	.000	.000	.005	.000
Training for Jobs	Pearson Correlation	.138**	.107*	.132**	.137**	.177**	.354**	.155**	.098*	.134**
	Sig. (2-tail)	.001	.014	.002	.002	.000	.000	.000	.025	.002
Using Media	Pearson Correlation	.296**	.241**	.248**	.202**	.339**	.356**	.327**	.194**	.286**
	Sig. (2-tail)	.000	.000	.000	.000	.000	.000	.000	.000	.000
Imparting Information	Pearson Correlation	.005	-.098*	-.037	.007	.016	.155**	-.011	.165**	.142**
	Sig. (2-tail)	.900	.024	.392	.878	.706	.000	.809	.000	.001
Knowledge of subject	Pearson Correlation	.172**	.085	.072	.028	.174**	.192**	.073	.192**	.323**
	Sig. (2-tail)	.000	.052	.099	.517	.000	.000	.093	.000	.000

University teachers who believe in the use of media are practicing this within an online environment. The use of media is further associated with 'motivating students' (r=0.339, p<0.001) and to support specific vocational skills (r=0.356, p<0.001). University teachers also hold beliefs about the importance of their own subject knowledge (r=0.323, p<0.001) and appear to practice or demonstrate this

knowledge to some extent within the online environment. In the original research (Prosser and Trigwell, 1999) this would be perceived as teacher-centred.

The amount of data in this survey and its complexity makes interpretation of the main themes difficult. It was therefore decided to conduct a factor analysis in order to reduce the data to more manageable proportions as in Norton et al (2005). Factor analysis reduces a data set by identifying groups among the inter-correlations within the variables and provides the researcher with 'factors' which show where variables cluster together.

4.9 Factor Analysis

Factor analysis is a statistical technique which can be applied to a set of variables in order to discover which variables in the set form coherent subsets (Tabachnick and Fidell, 2007). The technique is frequently used in psychology to objectively assess intelligence and personality characteristics and has been often used in the research on teachers' beliefs and practices. Factor analysis aligns variables into related clusters, so that it can be seen which of the subsets are related to each other. The 9 subsets which made up the Beliefs and Practices scales were subjected to principal components analysis (PCA) using SPSS version 17. Detailed findings from the separate factor analysis of beliefs and practices follow.

4.9.1 Factor Analysis BELIEFS

The correlation matrix (Table 9) had confirmed that this data sets' suitability for factor analysis as it indicated a number of coefficients of .3 and above. Pallant (2005:182) recommends that if there are no values above .3 then the use of factor analysis should be reconsidered.

SPSS generates two statistical measures to determine the factorability of a data set; Bartlett's test of sphericity (1954) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (1970, 1974). The factorability of the correlation matrix was confirmed with the KMO value reaching statistical significance at 0.736, exceeding the recommended value of 0.6 (Kaiser 1970, 1974). Bartlett's Test of Sphericity (1954) is significant ($p<.05$) confirming that factor analysis can be considered appropriate (Table 10).

Table 10: NON-EXPERT TEACHERS' BELIEFS KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		
Kaiser- Meyer-Olkin Measure of sampling adequacy		.736
Bartlett's Test of Sphericity	Approx. Chi-Square	643.64
	Df	36
	Sig.	.000

In order to confirm the robustness of Principal Component Analysis other means of factor analysis were also explored. These included principal axis factoring and parallel analysis. All methods were found to be similar in their results, so it was decided to use Principal Component Analysis as this had been used in the Norton et al (2005) research.

Principal Component Analysis revealed the presence of two factors with eigenvalues greater than 1.00. These factors respectively explain 29% and 14% of total variance; 43% in total (see Table 11 below).

Table 11: NON-EXPERT TEACHERS' BELIEFS Total Variance Explained – Non-expert teachers BELIEFS

Total Variance Explained			
Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.624	29.151	29.151
2	1.260	14.000	43.151

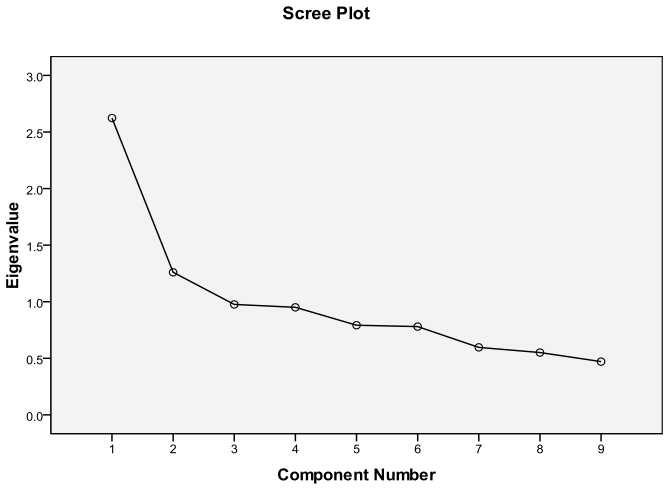
Catell's (1966) scree test (Graph 4 below) suggests that three factors could be retained for further investigation. This opposed the number of factors suggested by the eigenvalues, but three factors were initially pursued. This analysis however had multiple double loadings and even after varimax rotation it was difficult to ascertain

its meaning. Following this analysis a three factor solution was therefore rejected and it was decided to report the analysis provided by the two-factor solution, as Tabachnick and Fidell (2007:608) report

> 'A good PCA or FA "makes sense" a bad one does not. Interpretation and naming of factors depend on the meaning of the particular combination of observed variables that correlate highly with each factor'.

This decision was further supported by the results from parallel analysis which indicated two components with eigenvalues exceeding the corresponding criterion values for a randomly generated data set of the same size (9 subsets x 529 respondents)

Graph 4:NON-EXPERT TEACHERS' BELIEFS Scree Plot of Factor Analysis for non-expert teachers' beliefs



To assist in the interpretation of these two components varimax rotation was performed. The rotated solution had a number of strong loadings and for further clarity loadings below .4 were suppressed. The findings here are consistent with previous research (Norton et al, 2005; Richardson et al 2007) on the Beliefs scale,

with factor one loading strongly and exclusively on items from the LF scale and factor two loading strongly and exclusively on KT items. These factors were therefore named accordingly.

Table 12: NON-EXPERT TEACHERS' BELIEFS Varimax Rotated Component Matrix

Knowledge Transfer / Teacher-centred items shown in shaded boxes

	Component	
BELIEFS	**1 Learning Facilitation**	**2 Knowledge Transmission**
Interactive Teaching	.774	
Pastoral Interest	.653	
Motivating Students	.626	
Facilitative Teaching	.622	
Problem Solving	.421	
Imparting Information		.736
Training for Jobs		.682
Using Media		.568
Knowledge of Subject		.407
Extraction Method: Principal Component Analysis		
Rotation Method: Varimax with Kaiser Normalization		
Rotation converged in 3 iterations		

It can be seen that there is more of an orientation towards learning facilitation than knowledge transmission in beliefs, as four subsets have scores above 0.6, and this is only the case for two of the subsets in Knowledge Transmission. Some university

teachers therefore share sufficient variance in their scores to suggest they hold LF beliefs whilst others share sufficient variance to suggest they hold KT beliefs. These findings supports the work of Norton et al (2005)which corroborated Gow and Kember's (1993) distinction between learning facilitation and knowledge transmission as conceptions of teaching and Prosser's and Trigwell's (1999) distinction between student-centred and teacher-centred approaches to teaching.

4.9.2 Factor Analysis – NON-EXPERT TEACHERS PRACTICES

The Kaiser-Meyer-Olkin value (Table 13) for the Practices subset of questions was 0.900, exceeds the recommended value of 0.6 (Kaiser 1970, 1974) and Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, which confirms the factorability of the correlation matrix for the Practices variables.

Table 13: NON-EXPERT TEACHERS' PRACTICES KMO and Bartlett's Test of Sphericity - PRACTICES

KMO and Bartlett's Test		
Kaiser- Meyer-Olkin Measure of sampling adequacy		.900
Bartlett's Test of Sphericity	Approx. Chi-Square	2091.930
	Df	36
	Sig.	.000

In order to confirm the robustness of Principal Component Analysis other means of factor analysis were also explored. These included principal axis factoring and parallel analysis. Again, Principal Component Analysis was chosen in order to mimic the Norton et al (2005) research as much as possible.

Principal Component Analysis revealed the presence of one factor with an eigenvalue greater than 1.00 (Table 14). This factor explains 51.48% of the total variance. However as can be seen one other factor had an eigenvalue of 0.997, explaining a further 11% of variance, and as this was so close to 1.0 it was decided to extract two factors for further analysis.

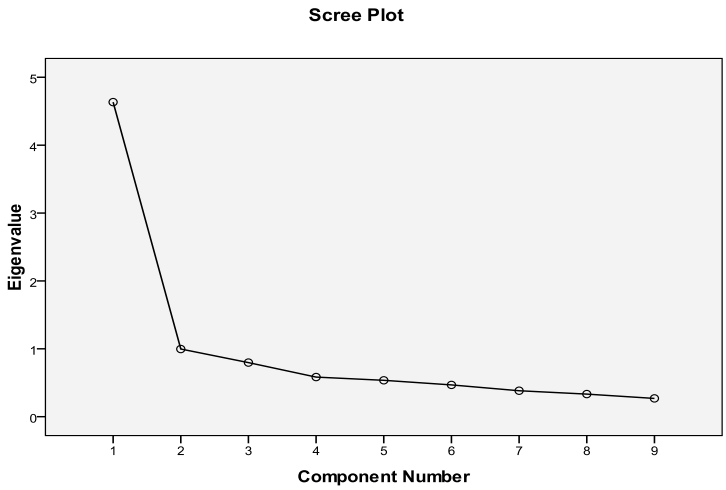
Table 14: NON-EXPERT TEACHERS' PRACTICES Factor Analysis Total Variance Explained PRACTICES

Total Variance Explained			
Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	4.634	51.487	51.487
2	.997	11.074	62.562

Catell's (1966) scree test (Graph 5) confirmed that two factors should be retained for further investigation. This was further supported by the results from parallel analysis which indicated two components with eigenvalues close to or exceeding

the corresponding criterion values for a randomly generated data set of the same size (9 subsets x 529 respondents).

Graph 5: NON-EXPERT TEACHERS' PRACTICES Scree Plot to show extracted factors for PRACTICES



In order to interpret the identified factors varimax rotation was performed (Table 15 below), Rotation is a process 'by which the solution is made more interpretable without changing its underlying mathematical properties.' (Tabachnick & Fidell, 2007:609) The rotated solution had a number of strong loadings and so for additional clarity loadings below .4 were suppressed.

Table 15: NON-EXPERT TEACHERS' PRACTICES Rotated Component Matrix

Knowledge Transfer / Teacher-centred items shown in shaded boxes

	Component Mixed approach	**Component Motivational KT (Knowledge Transfer)**
PRACTICES	1	2
Imparting Information		.869
Interactive Teaching	.842	
Knowledge of Subject		.729
Using Media	.687	
Facilitative Teaching	.684	
Problem Solving	.670	
Motivating Students	.666	.556
Training for jobs	.578	.556
Pastoral interest	.564	

All LF subsets (Problem Solving; Interactive Teaching; Facilitative Teaching; Pastoral interest and Motivating Students) load on factor one. However 'Using media' and 'training for jobs' also load on this factor, which suggests non-expert university teachers' associate these items with learning facilitation. With respect to 'using media' Gow and Kember (1993) had associated this subscale with an orientation towards knowledge transmission, as they had perceived the use of media to be a means to present and 'transfer' information from teacher to student. The finding of

the present study however is similar to that found in Norton et al (2005), in which they concluded that teachers with an orientation towards learning facilitation may be making a principled use of media, although this would seem unlikely in the present study due to the lack to correlation between beliefs and practices found earlier.

The highest loadings on factor two are both 'Knowledge Transmission' components 'Imparting Information' and 'Knowledge of Subject'. However, problems exist within this factor analysis in that two of the subsets ('Training for Jobs' and 'Motivating Students') load on both factors. In both instances the score on factor two is lower. Tabachnick and Fidell (2007:649) cite Comrey and Lee's (1992) work which suggests that,

> 'loadings in excess of .71 (50% overlapping variance) are considered excellent, .63 (40% overlapping variance) very good', .55 (30% overlapping variance) good, .45 (20% overlapping variance) fair, and .32 (10% overlapping variance) poor. Choice of the cutoff for size of loading to be interpreted is a matter of researcher preference. Sometimes there is a gap in loadings across the factors and, if the cutoff is the gap, it is easy to specify which variables load and which do not. Other times, the cutoff is selected because one can interpret factors with that cutoff but not with a lower cutoff.'

If, in the present study, values below 0.63 (i.e. with less than 40% of variance) were suppressed the factors become easier to interpret. With factor one appearing to be more concerned with LF and factor two becoming exclusively concerned with KT.

Nevertheless this factor analysis is weakened by the fact that some of the subsets load on more than one factor.

The correlation analysis showed that there were only weak or moderate correlations between the subsets in beliefs and practices. The standard deviation illustrated that the differences between the LF beliefs and practices scores were greater than the differences between the KT beliefs and practices scores and that these differences were all statistically significant ($p<.001$). This information helps to illustrate that in practices no clear LF/KT divide exists and so it is unsurprising that in factor analysis the subsets load on more than one factor. As can be seen in Table 15 'Training for Jobs' and 'Use of Media' are both associated with LF subsets; these items have consequently been taken into account in naming the factor. Factor one also contains seven of the nine subsets included in the questionnaire which suggests that university teachers associate a wide range of practices in their online teaching. From the analysis of mean scores earlier it was found that these practices were more likely to be KT items than LF items, but LF items still appear to be used, albeit to a lesser extent. This factor was therefore named 'Mixed approach' after Ertmer (2005).

Factor two conversely is clearly more strongly associated with KT but as with factor one not exclusively so. The inclusion of the 'Motivating Students' subset should not

be overlooked and it is akin to research carried out by Kember and Kwan (2000) where an exclusively KT approach was seen to be ameliorated in some university teachers by some caring approaches, which they described as 'Caring KT' (Caring Knowledge Transmission). Factor two has consequently been named 'Motivational Knowledge Transmission' or 'Motivational KT' and a fuller discussion of this naming appears at the end of this chapter.

4.10 Comparison of beliefs and practices in non-expert teachers

Table 16 below compares the factors identified in Beliefs and Practices in non-expert teachers. Once again, factor loadings below 0.4 in absolute magnitude are not shown.

Factor Analysis provides a clearer picture of this data set. With the use of varimax rotation and the suppression of smaller loadings, two distinct 'Belief' clusters appear which supports previous research (Gow and Kember, 1993; Prosser and Trigwell, 1999; Norton et al, 2005; Richardson et al, 2007). One factor remains largely 'Learning Facilitation', the other factor largely remains 'Knowledge Transmission'.

Table 16: A comparison of Factor solutions for beliefs and practices for non-expert teachers

Knowledge Transfer / Teacher-centred items shown in shaded boxes

Subscale	Beliefs		Practices	
	Factor 1 Learning Facilitation	Factor 2 Knowledge Transmission	Factor 1 Mixed Approach	Factor 2 Motivational KT
Learning facilitation				
Problem Solving	.42		.67	
Interactive Teaching	.77		.84	
Facilitative Teaching	.62		.69	
Pastoral Interest	.65		.56	
Motivating students	.63		.67	.56
Knowledge Transmission				
Training for Jobs		.68	.58	.56
Use of media		.59	.69	
Imparting Information		.74		.87
Knowledge of subject		.40		.73

The 'Practices' factor analysis is more difficult to interpret. Factor one includes all five LF subsets, but also includes two of the four KT subsets, i.e. 'Using media' and 'Training for Jobs'. The second factor is more clear with three of the four KT subsets ('Imparting information', 'Training for Jobs', and 'Knowledge of subject') loading onto it, in addition to a LF subset 'Motivating Students'. These factors suggest a mixed, or unprincipled, approach to online teaching practices in the non-expert teacher group.

The descriptive statistics and correlations show that there are few similarities between respondents' scores on beliefs and practices and that where similarities exist these are small and found only in KT items. The factor analysis shows that belief items are associated along KT/LF distinctions but not so practices. The conclusion drawn thus far then, is that few similarities exist between non-expert teachers' pedagogical beliefs and online teaching practices. As the scores appear to suggest that beliefs and practices are not closely related, it was decided to assess the size of the difference between the beliefs and practices scores in order to understand the relative size of the gap between the two. Consequently a paired-sample t-test was conducted in order to assess the scores globally and on an item-by-item basis.

4.11 Paired-sample t-test

Paired sample t-tests (also known as related t-tests) are used to test the same participants who answer questions on two different conditions, in this case their beliefs and practices. This test allows each respondent to be tested against themselves, i.e. to compare their score in one area (e.g. beliefs) with their score in a related area (e.g. practices).

A significant difference ($p<.0001$) was found between the total score for beliefs (66.84) and the total score for practices (53.27). The mean score for LF Beliefs was

39.42, compared to the mean score for LF Practices 27.32 (a mean difference of 12.09). The mean score for KT Beliefs was 27.42, compared to a practices mean score 25.95 (a mean difference of 1.47). This shows that the biggest differences between beliefs and practices exist between LF beliefs and LF Practices. Therefore non-expert university teachers are less likely to enact their LF beliefs, than their KT beliefs in online learning environments.

Table 17 shows the difference between the beliefs and practices scores for each paired subset. As can be seen in every case, apart from 'Imparting Information' the belief score is higher than the practice score. As can be seen all of these results are statistically significant ($p<0.0001$). This illustrates that teachers' ideal pedagogical beliefs are not being practiced in online learning environments. The Confidence Intervals show the lower and upper range of 95% confidence in these scores when generalising to the population and as would be expected in a large survey these ranges are quite modest (Appendix 5).

The starkest difference of 4.01 is in 'Interactive Teaching' which teachers indicate is their most strongly held belief (9.06), but, in online environments, it is their least practiced behaviour (5.05). There is, nevertheless, an orientation towards LF as 'Motivating students' and 'Facilitative Teaching' score highly in beliefs and practices showing that these two areas are more aligned than others. So, university teachers

are most likely to agree with the statements 'I use online environments to encourage my students to become self-motivated individuals' and 'In my online environment I spend much of my time trying to present subject material in a way which will stimulate the interests of students'; and 'One of my principal aims in the VLE is to provide an environment in which students are helped to 'learn for themselves' rather than be taught.' Both of these statements stress that teachers are seeking autonomy or self-directed behaviour from their students.

The middle ranking subsets (i.e. 4-6) indicate that university teachers next most agree with Knowledge of Subject, Imparting Information (ranked 9th and last as a belief but 4th as a practice); and 'Using Media'. This shows that their regular practice includes these three KT items, i.e. 'to prepare for my online environment I spend a lot of time ensuring that I have a thorough knowledge of my subject', and 'for my online teaching I keep abreast of my field of knowledge all the time'; 'I use the online environment to pass on what information I know to students', and ''within the online environment I give as much information as possible to my students'; 'I use audio-visual stimuli in online environments', and 'I use online environments to expose my students to new technologies'. These middle ranking practices would all be categorised as KT, or teacher-centred, in the Gow and Kember (1993) and Trigwell and Prosser's (1996) research, as the teacher focuses more upon their own actions than upon the students' actions. What matters in

these practices is the teacher focussing upon what s/he knows and attempting to transfer information and meaning simultaneously to their students.

Table 17: Paired Sample T-Test to compare responses to BELIEFS and PRACTICES questions

Knowledge Transfer / Teacher-centred items shown in shaded boxes

Pairs	Mean	T	Sig. (2-tailed)	Confidence-Interval	t^2	Eta squared
Problem Solving		27.71	.000	2.4-2.8	767.84	0.59
Belief	8.78					
Practice	6.16					
Interactive Teaching		45.36	.000	3.8-4.2	2057.52	0.80
Belief	9.06					
Practice	5.05					
Facilitative Teaching		15.21	.000	1.2-1.6	231.34	0.30
Belief	8.91					
Practice	7.52					
Pastoral interest		33.30	.000	2.8-3.2	1108.90	0.68
Belief	8.21					
Practice	5.19					
Motivating Students		21.56	.000	1.6-1.9	464.40	0.47
Belief	8.92					
Practice	7.16					
Training for Jobs		10.59	.000	0.7-1.0	112.15	0.18
Belief	6.88					
Practice	5.98					
Using Media		4.96	.000	0.3-0.7	24.60	0.04
Belief	6.68					
Practice	6.23					
Imparting Information		-6.89	.000	-0.9-0.5	-13.78	-0.02
Belief	6.02					
Practice	6.75					
Knowledge of Subject		10.04	.000	0.7-1.0	100.80	0.16
Belief	7.84					
Practice	6.99					

The lower ranking subsets (i.e. 7-9) are then: 'problem-solving', 'training for jobs', 'pastoral interest' and 'interactive teaching'. These subsets indicate the areas which university teachers practice least in online environments. Three are LF subsets and one (training for jobs) is KT. This draws attention to the distinct differences between beliefs and practices once again. University teachers are least able to agree with the statements: ''I spend more time in online environments directing discussion than giving information' and 'I get students to participate in online discussions as much as possible'; and ''when using online environments I keep in touch with students' pastoral problems', and ''I use online environments to show that I am concerned with my students' well-being.'

The significance level in Table 17 shows that the two sets of scores are unlikely to have occurred by chance. In order to understand the magnitude of the difference between the scores, a commonly used (Pallant, 2005:212) effect size statistic, eta squared, was calculated.

$$\text{Eta squared} = t^2 / t^2 + N - 1$$

Cohen (1988) cited in Pallant (2005:212) interprets eta squared values as 0.01=small effect; 0.06=moderate effect, 0.14=large effect. The differences between the scores on beliefs and practices questions are therefore small in the categories 'Using Media' (0.04) and 'Imparting Information'(-0.02), showing that these scores are most closely aligned. The implication of this is that non-expert university

teachers' associate using audio-visual stimuli and new technology (questions 29 and 44 Appendix 4) with imparting information (questions 34 and 39 Appendix 4). The other subset differences are large however, showing a lack of close alignment between beliefs and online practices, with the biggest differences seen between LF Beliefs and LF Practices. In this analysis therefore it would appear that, despite a stated belief in 'Learning Facilitation', there is only a small alignment with 'Learning Facilitation' online practice.

Summary

The results from the correlations and factor analysis show that there are few similarities between non-expert teachers' pedagogical beliefs and online teaching practices and the paired sample t-tests show that there are significant differences between their mean scores in each paired subset. In order to ascertain which of the independent variables might account for this 'disjunction' (Samuelowitz and Bain, 2001) a series of multivariate analysis of variance tests were conducted and the results of these tests follow.

4.12 MANOVA

As the research question seeks to compare respondents on a range of different characteristics, multivariate analysis of variance (MANOVA) was conducted.

MANOVA is used when there is more than one dependent variable which are related in some way. In this research there are four dependent variables (DV), i.e. Beliefs Learning Facilitation; Beliefs Knowledge Transmission; Practices Learning Facilitation and Practices Knowledge Transmission. The research question seeks to understand whether any of the independent variables (IV), i.e. gender, age range, years teaching; teaching qualification; teaching and learning development; online development; HEA membership; and Pre'92/Post '92 university, have a significant impact on the beliefs and/or online practices of university teachers. The factors identified in factor analysis created a new summary dependent variable, which is used to identify any significant variables which may be causing the factors to emerge. MANOVA also works best 'when the dependent variables are only moderately correlated' (Pallant 2005:255). This is the case with this particular survey (see Correlations Matrix Table 9)

The MANOVA test allows the researcher to analyse more than one DV and more than one IV. The more analyses that are run against the data would normally increase the possibility of a 'Type 1' error (i.e. getting a false indication of significance where none exists) and MANOVA helps to avoid this. As a further safeguard against Type 1 errors the Bonferroni adjustment (to devise a more conservative alpha) can be used if necessary.

A series of one-way multivariate analysis of variance (MANOVA) were conducted to explore differences between the DVs Beliefs Learning Facilitation; Beliefs

Knowledge Transmission; Practices Learning Facilitation and Practices Knowledge Transmission with each of the IVs. The MANOVA generates a linear grouping of each of the DVs and analyses the variance between this new variable and all other dependent variables. This creates a new DV against which it analyses the effect of the IVs. Secondly, a further series of one-way MANOVA were conducted to explore differences between the DVs 'Mixed approach' Practice and 'Motivational KT' Practices with each of the IVs.

The data was initially checked to ensure that it conformed to the assumptions made by the test. The sample size is sufficiently large and the assumption of normality requires a sample size of at least 20 in each cell to ensure 'robustness' (Pallant 2005:249). Mahalanobis distances were checked to ensure normality and this test can be seen in Appendix 8. The Mahal. Distance maximum value equals 48.471. The number of DVs is 4. This value is compared to a 'Critical value' of 18.47 (Pallant 2005:249). As the Mahal. Distance is larger than this critical value it suggests that there are some 'multivariate outliers' in the data file. Further investigation found that there were 3 cases with scores over the critical value 18.47. On reviewing their responses it was felt that these were plausible and as there were only 3 cases in the 529 sample it was decide to leave these in.

4.12.1 INTERPRETATION OF OUTPUT FROM MANOVA

Box's Test of Equality of Covariance Matricies was included in the test for all IVs. This test identifies whether the data violates the assumption of homogeneity of variance-covariance matricies. In every case the significance value value indicated that this assumption had been met ($p>0.001$). In addition Levene's Test of Equality of Error Variances was also conducted. Again in all cases the significance value was more than .05 ($p>0.05$) which indicates that the assumption of equality variance has been met.

4.12.1 BELIEFS

A MANOVA was conducted to investigate the impact of all IVs on beliefs. In order to distinguish between the two main approaches identified in previous research and from the present study's factor analysis two DVs were used: Beliefs Learning Facilitation and Beliefs Knowledge Transmission.

Beliefs: Gender

A statistically significant difference was found between male and female university teachers ($F\ 2(526)=5.55$, $p<.005$, Wilks' Lambda .979; partial eta squared 0.21). Female university teachers are more likely to have 'Learning Facilitation' beliefs (mean 39.93) than their male counterparts (mean 38.94).

Beliefs: Age Range

The age range of participants was divided into four groups. These were:

- Age range 1 = 24 – 38.76
- Age range 2 = 38.77- 46.14
- Age range 3 = 46.15 – 53.53
- Age range 4 = 53.54 – 72

The MANOVA showed that a belief in LF increased with age, and a belief in KT decreased with age. The MANOVA showed, however, no significant differences in beliefs according to age.

Beliefs: Years Teaching

A statistically significant difference was found when the impact of 'years teaching' was explored. (F 2(1050)=2.35, p=.052, Wilks' Lambda .982; partial eta squared 0.009).

Years Teaching was split into 3 equal groups. These were:

- Years Teaching range 1 = 0-6 years
- Years Teaching range 2 = 7 – 15 years
- Years Teaching range 16+ years

This test shows that the least experienced teachers (0-6 years) are more likely to believe in a KT approach, (mean = 28.10, significance p=.04). This belief weakens in more experienced teachers: 6-11 years experience, mean=27.03; up until 16+ years experience when the mean increases slightly again (27.06).

Beliefs: Discipline

The MANOVA found that there were no significant differences in LF or KT beliefs according to discipline. (F 2(1046)=2.35, p=.06, Wilks' Lambda .966; partial eta squared 0.017).

Beliefs: Teaching Qualification

Another statistically significant difference can be seen in the beliefs of those who possess a teaching qualification. (F 2(526)=5.14, p=.006, Wilks' Lambda .981; partial eta squared 0.19). Teachers with a teaching qualification are more likely to believe in a LF approach (mean=39.73), as opposed to those without a teaching qualification (mean=38.99)

Beliefs: HEA Members

HEA Members are also statistically significantly more likely to hold LF beliefs (F 2(1050)=4.17, p=.002, Wilks' Lambda .969; partial eta squared 0.16). HEA members mean=40.09, as opposed to non-members mean=39.09.

Beliefs: Online Development

Respondents who have received some form of online development are also statistically significantly likely to hold LF beliefs. (F 2(526)=3.66, p=.026, Wilks' Lambda .986; partial eta squared 0.14). Those in receipt of online development mean=39.71, those who had no online development mean=39.07

Beliefs: Learning & Teaching Development

There are no statistically significant differences however between the beliefs of those who have received some form of learning and teaching development and those who have received none.

Beliefs: PrePost '92 University

Those employed in Post '92 universities are statistically significantly more likely to hold LF beliefs than those in Pre '92 universities. (F 2(1050)=2.67, p=.031, Wilks' Lambda .980, partial eta squared 0.10). The mean score of those employed in Post '92 institutions =39.84, whereas those employed in Pre'92 institutions mean score =38.90.

4.12.2 PRACTICES

A series of MANOVAs were then conducted to investigate the impact of all IVs on practices. In order to distinguish between the two main approaches identified in previous research and from the present study's Factor Analysis two DVs were used: Practices Learning Facilitation and Practices Knowledge Transmission. A further analysis was run using the DVs 'Mixed approach' and 'Motivational KT' identified by the factor analysis.

Learning facilitation or Knowledge Transmission Practices

There were no statistically significant differences found among this group of teachers in their approaches to their online practices on the following variables: Age Range; Subject taught; Learning & Teaching Development; Discipline and Pre/Post'92. Other variables did illustrate statistically significant differences however and the details of these follow.

Practices (LF/KT): Gender

When it comes to practices female university teachers are statistically significantly more likely to use LF practices than male university teachers. (F 2(526)=7.48, p=.001, Wilks' Lambda .972, partial eta squared 0.28). The female mean =28.12, whereas the male mean=26.58. This approach appears to suggest an alignment between female teachers beliefs and practices.

Practices (LF/KT): Years Teaching

'Years Teaching' practices were statistically significant, (F 2(1050)=2.48, p=.042, Wilks' Lambda .981, partial eta squared 0.009). This shows that inexperienced teachers (0-6 years) are more likely to take a KT approach, mean=26.84; 6-15 years, mean=25.53, 15+years, mean=25.37. This approach aligns with their beliefs as seen above.

Practices (LF/KT): Teaching Qualification

Teachers who have a teaching qualification are statistically significantly more likely to adopt LF practices. (F 2(526)=5.07, p=.007, Wilks' Lambda .981, partial eta

squared 0.019). Those teachers with a teaching qualification, mean=28.02; those without a teaching qualification, mean=26.39.

Practices (LF/KT): HEA Members Practices

HEA Members are also statistically significantly more likely in their online practices to take a LF approach. (F 2(1050)=3.28, p=.011, Wilks' Lambda .975, partial eta squared 0.012). HEA Members mean=28.24; compared to a non-member mean of 26.87.

Practices (LF/KT): Online Development

Those who have received online development are statistically more likely to use both LF and KT approaches in online environments, (F 2(526)=5.49, p=.004, Wilks' Lambda .980, partial eta squared 0.02). This is particularly interesting as it implies that university teachers are either being taught to use both approaches in their online environments or that this developmental activity is increasing their use of unfamiliar approaches.

Those in receipt of online learning development have a mean score for a LF approach of 28.16, compared to those who have not received any online development who have a mean score of 26.37. Those in receipt of online learning development have a mean score for a KT approach of 26.64, compared to those who have not received online development training who have a mean score of 25.16.

Using the factors identified during the factor analysis for non-expert teachers online practices a further set of MANOVAs were conducted against these factors. The results are provided below:

Practices (Mixed approach/Motivational KT)

A number of variables were no longer statistically significant when the mixed approach factor was used. These include Gender; Age range; Years teaching; Subject taught; Learning & Teaching Development; and PrePost '92.

Practices (Mixed approach /Motivational KT): Teaching Qualification

However teachers who have a Teaching Qualification were statistically more likely to take a 'Mixed approach' approach than a 'Motivational KT' approach, (F 2(526)=6.13, p=.002, Wilks' Lambda .977, partial eta squared 0.023). This, in conjunction with the finding above that qualified teachers were more likely to take a LF approach to their online teaching implies that the 'Mixed approach' factor is more closely associated with LF rather than KT as considered during the factor analysis.

This finding suggests that qualified teachers are attempting to exploit all uses of a virtual learning environment. The mean score for those with a teaching qualification who take a mixed approach is 44.33, compared to those without a teaching qualification where the mean score is 41.88.

Practices (Mixed approach/Motivational KT): HEA Member

Those with HEA Membership are also more likely to take a 'Mixed approach' than a 'Motivational KT' approach (F 2(1050)=4.44, p=.001, Wilks' Lambda .967, partial eta squared 0.017) This, in conjunction with the finding above that HEA Members were more likely to take a LF approach to their online teaching implies that members generally have a LF approach but are exploiting all uses of online learning environments, including KT items. Members' mean score = 44.61, compared to non-members' mean score of 42.66.

Practices (Mixed approach/Motivational KT): Online Dev

Those who have received online development are also more likely to take a 'mixed' approach and also more likely to take a KT approach.(F 2(526)=7.23, p=.001, Wilks' Lambda .973, partial eta squared 0.027) Those who took a 'mixed' approach and had received online development had a mean=44.76, compared to those who had not received any online development mean= 41.60. Those who had a 'Motivational KT' approach and had received online development had a mean=27.43, compared to those who had not received any online development mean= 26.22.

This, in conjunction with the finding above that those who had received online development were more likely to take a LF approach to their online teaching implies that this development encourages a variety of approaches and exploits all uses of a virtual learning environment.

4.13 Summary of quantitative analysis: Non-expert sample

This series of statistical tests has revealed that non-expert university teachers have stronger beliefs than practices and that their LF beliefs are stronger than their KT beliefs. Their LF practices have higher mean scores than their KT practices but the SD between their KT practices is smaller than the SD between LF practices suggesting that KT beliefs and practices are more closely aligned than LF practices and more generally agreed upon. The differences between the scores in the paired-sample t tests of all LF subsets is large and significant which together with the Pearson product moment correlation analysis illustrates that non-expert teachers' LF beliefs and online practices are not closely aligned.

The MANOVA analysis for Beliefs reveals that a LF approach is statistically significantly more likely in female university teachers; those who had been teaching for more than 6 but less than 15 years; those who held a teaching qualification; HEA members; those who had received online development and those who were employed in Post '92 universities.

The MANOVA analysis for Practices reveals that a LF approach is statistically significantly more likely in female university teachers; those who have been teaching for more than 6 years; those who hold a teaching qualification; and those

who are who are HEA members. Those who had received online development were statistically significantly more likely to also take a KT approach.

The MANOVA analysis for Practices identified through Factor Analysis reveals that a 'mixed' approach is statistically significantly more likely in university teachers who have a teaching qualification and HEA members. Those who have received online development are statistically significantly more likely to take a 'mixed' approach and a 'Motivational KT' approach.

This provides an overview of non-expert online teaching in UK universities which implies that female teachers; qualified teachers; those who are members of the Higher Education Academy and those with more than 6 years experience are statistically significantly more likely to have LF beliefs and practices. Conversely male teachers; those who do not possess a teaching qualification; those who are not members of the HEA and inexperienced teachers (less than 6 years experience) are statistically more likely to take a KT approach. If a LF approach is desirable in order to promote student-centred learning within online environments then these finding imply that possession of a teaching qualification / HEA Membership encourages a student-centred approach to teaching.

Interestingly receiving online development appears to encourage both LF and KT practices, which suggests that the online development either promotes the use of all the facilities provided by an online environment or there may be a development of teachers' practice to incorporate new practices outside of their usual activities.

In addition to the quantitative analysis provided by the instrument the online survey also sought additional 'voluntary' information where non-expert teachers could leave additional comments as they felt appropriate. This information was used to help to put the quantitative analysis above in greater context.

4.14 Analysis of qualitative data

The online survey provided three 'open boxes', so that respondents could provide additional information. These boxes were provided at three points during the survey these were:

- **Q.45. Please briefly explain why you do not use online learning environments to interact with your students.** This question followed the first set of 'Beliefs' questions and a question on the frequency of use. Where participants indicated that they did not use an online learning environment in their teaching they 'skipped' the practice questions, as these clearly would not apply.

- **Q63. Any comment you would like to make?** This question followed a set of questions relating to the priority given to teaching and learning and online learning by their university, their department, their subject and themselves.

- **Q.69. Any comment you would like to make?** The final comments box followed a series of questions asking participants about their emotional reaction to technology in their personal life and in use in their teaching.

Non-expert sample comments

Of the 551 respondents who completed the questionnaire, there were a total of 273 comments made, totalling 9,585 words. An analysis of these comments revealed mainly negative comments about technology and its use in teaching. There were very few positive remarks, with some neutral comment and a few 'miscellaneous' comments, for example commenting on the questionnaire design itself or wishing the author luck with this work. A breakdown of the nature of these comments can be found below (Table 18).

Table 18: Non-expert comments

Type of comment	No. of contributions
Negative	209
Positive	11
Neutral	12
Miscellaneous	41
TOTAL	273

Positive Comments

These comments surrounded positive experiences with technology, students' reactions to online learning, or excitement about learning to use new software. Examples include:

> "use modern techno more at work than home, but I think it is great - far better for encouraging and motivating than dusty old books (tho they still haeva [sic] role to play!)"
>
> Female, 45, Psychology teacher

Other university teachers express frustration that their success with online environments has not been replicated elsewhere.

> 'Its just a tragedy, for 10 years I have had almost all my lectures prerecorded on CD or online. At first the students were very conventional and wanted to learn from books but now they are used to the medium and repeatedly thank me in feedback for the help, I get thousands of hits from the students a corrrelation [sic] of 0.44 between exam scores and use of the material. Part of the decline in standards that many complain about is a lack of communication between staff and students staff still frozen to the PowerPoint slides and not using multimedia.'
>
> Male, 57, Finance teacher

Other positive comments could be construed otherwise. For example the following statement could be perceived as a commitment to the advantages of technology use, or suggest some form of coercion,

> "I will have to make time - it is an investment in the future"
>
> Female, 55, HRM teacher

Neutral comments

These included remarks about the irrelevance of online learning to the individual respondent as they either did not currently use it or could see no reason to use it in the future.

Negative Comments

An analysis of the negative remarks reveals a large number of reasons for discontent. Many commentators expressed multiple reasons for their experiences and the list below attempts to prioritise this list in order of highest number of comments made to the lowest. The first 5 categories (i.e. Frustration with technology; Lack of time; Research demands; Lack of training; and Pedagogy) made up the vast majority of the commentary.

1. **Frustration with Technology.** These comments were either emotional, expressing dislike of technology, or detailing its poor maintenance and the disruption caused to their working lives when technology let them down.

> "The VLE we have is allegedly a priority but is inefficient and badly supported, so staff waste a lot of time on painstaking workarounds, and many give up using it."
>
> Female, 44, Statistics teacher

> "They rarely work properly, and, although some are probably fine, most come across as gimmicks led by the possibilities of the technology, rather tahnthe [sic] requirements of students, or lecturers."

Male, 46, Geography teacher

"Use of new technologies are dependent on whether they work. The fear of technology 'breaking down' limits application."

Male, 54, Strategic Management teacher

"I would be more inclined toward using online learning environments if I could be sure that the university systems would not fail my students and create hassle for me."

Male, 29, Management teacher

"I believe that we should be challenging studensts' [sic] use of social networking sites not pandering to it"

Female, 53, Economics teacher

2. **Lack of time**. This ranged from time to learn how to use the technology, to time needed to create and maintain online learning environments.

"i [sic] would definitely like to use more technologies, but it is about having the support from the university to be able to implement this. the [sic] resources are available, but time isn't."

Female, 37, Marketing teacher

"Time is really scarce and I have little time to invest in developing use of technology in teaching. Those colleagues who have more time to do this make students expect that all lecturers should use them."

Female, 44, Innovation Management

3. **Research demands.** These comments illustrated that research was considered a more important part of their role than any teaching activity.

"The nationally oustanding [sic] results for our subject in the National Student Survey are seemingly dismissed by our University and we are being directed to change our priorities. "

Male, 43, Environmental Science teacher

> "The RAE etc has forced universities to prioritise research ahead of teaching and there is a constant tug of war between those that prioritise teaching and those that prioritise research. It is impossible to prioritise both since there is not enough time**."**
>
> Female, 31, Mathematics teacher

4. **Lack of ability/training.** These remarks frequently expressed a desire to use online environments but due to a lack of training the respondent was unable to do so. Frequently the reason given for this lack of training was put down to insufficient time or differing priorities within their workloads.

> "While our university gives high priority to the use of the VLE (i.e. everything should be on there in case a lecturer is off sick, etc.) there seems to be less emphasis on training staff in techniques to encourage online interaction with students …"
>
> Male, 26, Business Information teacher

> "The problem with new technology is the need for team and institutional support. Much of the technology supported by the institution is finance driven and some poor understanding of resourcing [sic] for new technology. In my view there is a massive over spend on kit and insufficient spend on training and development and curriculum development."
>
> Male, 56, Business Studies teacher

> "lack of technical skills hugely slows down the development of my online learning environments + the clunkiness of webct"
>
> Female, 46, Sociology teacher

5. **Pedagogical differences.** These remarks cast doubt on technology's ability to be an effective medium for teaching higher education students. Many noted that online environments were useful sites for storing content but

were frustrated by their lack of success in using the more interactive features provided. In these circumstances some respondents blamed the students whilst others expressed doubts about whether the nature of their particular courses could ever make much use of an online environment.

> "These answers will come over as very negative. My real views about new technology are neutral: if something helps me teach and I have time to use it, I'll use it. My university's views are different: it is very technology led and requires us to use new technology whether we think it pedagogically effective or not. It is also unwilling to invest resources in finding out what technologies work and which do not. The result is a dispiriting atmosphere where the emphasis is on the form and not the content. New=Good Old=Bad."
>
> Male, 55, Economics teacher

> "Online environment is basically used for day-to-day organization. Although I have set up discussion fora on there, the students are reluctant to use it. Their posts are almost exclusively about quetions [sic] relating to essays, or course organization."
>
> Male, 33, Business Studies teacher

6. **Enforced use.** Some commentators remarked that they used online environments because they were required to by their university and therefore had no choice. This appears to result in limited use of the environment.

> "our university thinks on line learning is a panacea for all course and departments, which it isnt.[sic]"
>
> Male, 42, Fashion Design teacher

7. **Personal Preference.** Many commentators said that they used online environments sparingly or not at all because they personally preferred to use other methods of teaching.

> "I do not wish to [use online technology]. Students must learn to interact directly with their tutors & fellow students."
>
> Male, 60, Marketing teacher

> "Not needed, provide lectures and tutorials, if student need help they are always welcome to come and see me in my office."
>
> Male, 29, Chemistry teacher

> "too impersonal. rather have the face-to-face interaction to be able to judge how well they are understanding the material"
>
> Female, 36, Science teacher

8. **Lack of opportunity.** Some respondents stated that the lack of hardware or software resulted in their limited use of online environments.

> "Unfortunately I do not have the resources (hardware and software) within my university to develop the use of technology in teaching."
>
> Male, 32, Education Studies teacher

9. **Intellectual Property.** These comments expressed a concern that work published in the online environment became the property of the university.

> "I have real concerns about intellectual property rights and the use of Blackboard as my Uni insists that anything published in this on-line environment implies a transfer of the copyright to the Uni. Therefore I am very reluctant to put lecture notes (my interpretation of concepts) in an on-line area that I now have no control over. I believe that the copyright is retained by me on all material that I produce

> and that I am simply contracted to deliver an educational service. This is never an issue when OHPs or white/black boards are used but only it appears if lecture material is in a soft format."
>
> Male, 38, Information Security teacher

10. **Health concerns.** These comments expressed concerns about the extended use of computers and reading from computer screens.

> "Not only is time important here. Change to new techologies [sic] has implications for lectuer [sic] health no they are habitual use of computers under the Health and Safety (Display Screen Equipment) Regulations 1992."
>
> Male, 58, Management Studies

> "In spite of recognising that new technologies are here to stay, as well as their potential use in my area of work – which I do acknowledge and think is potentially exciting and could invigorate my teaching – I also believe the virtual compulsion to do so as a means of going with the flow, particularly in personal /social life, borders on coercive / intrusive. Whilst we often hear about the benefits of new technologies, we hear less about the potential harms and what we stand to lose by them. We have yet to see the social / health / environmental fallouts of concerted and prolonged usage of such things as computers, mobile phones, MP3 players."
>
> Female, 45, Sports Studies teacher

The information provided by the comments above suggests that non-expert university teachers appear to be frustrated and ill at ease with much of their online teaching practice. Time is a significant feature represented in their commentary, i.e. that they have insufficient time to prepare for all their teaching, including online teaching, due to demands made elsewhere, most notably from research. However

not all respondents provided comments and therefore this frustration cannot be assumed to be universal.

4.15 Conclusion for non-expert teacher sample

The brief qualitative analysis supports the quantitative analysis to some extent and provides insight into the university teachers' context. Many contributions record teachers' concern for student learning, but the commentary is mostly concerned with the barriers to effective use of online environments. This analysis can be compared to the paired sample t-tests which illustrated the gap between a strongly held belief in the importance of 'interactive teaching' (mean 9.06) against their practice (mean 5.05) which illustrated that this was a practice they were least likely to adopt in their online learning environments. The commentary provided above illustrates why this may be the case. If university teachers feel they cannot rely on technology, don't have the time or skills to use it, or teaching is not seen as a priority, then the quantitative result quoted here is hardly surprising.

This range of barriers also provides insight into the 'unprincipled' use of online learning environments seen in the Pearson product-moment correlations and the factor analysis. There were few correlations between the paired subsets and where these existed they were small and in KT subsets; this is reflected in the commentary seen above, where online environment use may be enforced but not trusted and so

teachers use it to provide basic information but few have developed their use to the more interactive features of online environments. This extended practice appears to be due to a lack of time, training and a perception that higher priorities lie elsewhere. The concepts of LF and KT are clearly clustered in the beliefs factor analysis suggesting a coherent understanding and association of these concepts. However the items are dispersed in the practices factor analysis illustrating that non-expert university teachers are using online environments not in a way informed by their pedagogical beliefs but in a more haphazard manner possibly engendered by a lack of trust in technology, time to develop their teaching in this environment, a belief that teaching in general and online teaching in particular have a lower priority than their other work, a lack of interest, and/or a lack of technical and pedagogical ability.

The comments support the notion that a mixed approach is almost inevitable as university teachers struggle to meet competing demands on their time. Both the quantitative and qualitative data illustrate that non-expert teachers are using a wide range of teaching practices. These teachers have 'idealised' beliefs about teaching as LF or KT, but their online practices are mixed showing that they use more of the KT facilities provided by an online environment. In the paired-sample t-test it could be seen that there was a greater difference between non-expert teachers LF beliefs and online practices, than their KT beliefs and practices. The most popular practices are LF approaches ('Motivating students' and 'Facilitative

Teaching') and are both concerned with encouraging the students towards autonomous learning. The middle order practices are largely concerned with KT and the least popular subsets are LF, concerned with 'Interactive Teaching' and 'Pastoral Interest'. So whilst university teachers try to maintain some of their LF beliefs when practicing in an online environment, there are clearly some things that they are less likely to do. If discussion is an important element of deep learning for students then it would seem that university teachers are not designing their online environments to incorporate such activities. This would appear to be at odds with much of the advice on pedagogically appropriate use of online environments (Laurillard, 2002; Salmon 2003, 2004; Beetham and Sharpe, 2007).

These findings in conjunction with the overwhelmingly negative comments provided by the non-expert sample suggests that despite a belief in learning facilitation this is not what occurs in practice. Equally the strong KT factor found in beliefs is not mirrored in practices. It appears that for some a KT approach is associated with motivating students which implies that the use of online environments is perceived as a (potentially) interesting/useful addition to the teachers' tool-kit.

A full descriptive analysis is now provided for the 'expert' sample, followed by a comparison of the groups.

Chapter 5

Analysis of Expert Teachers Sample

5.1 Introduction

This chapter outlines the analysis of the 'expert' teacher group, i.e. UK National Teaching Fellows noted for their expertise in online learning (HEA 2009). Of the 'total population' of 64 NTFs with this expertise, 33 responded to the questionnaire. Of these 32 were current online practitioners and the analysis of their responses to the questionnaire follows. This represents 50% of the total population.

5.2 Characteristics of expert sample N=32

Table 19: Gender

	Actual	Percentage
Male	18	56.3%
Female	14	43.8%
	32	100%

Table 20: Age and Years Teaching in Higher Education

	Minimum	Maximum	Average
Age	37	61	49
Years in Teaching	7	40	18

Table 21: Other Independent variables

	Yes	No
Teaching Qualification	19 (59.4%)	13 (40.6%)
HEA Membership	28 (87.5%)	4 (12.5%)
Online Development	18 (56.3%)	14 (43.8%)
Teaching & Learning Development	26 (81.3%)	6 (18.8%)

Table 22: PrePost '92 University

	Actual	Percentage
Pre92 University	16	50%
Post92 university	16	50%
Total	32	100%

Table 23: Subject Taught (Discipline)

	Actual	Percentage
Unknown		
Hard Pure discipline area	5	15.6%
Soft Pure discipline area	4	12.5
Hard Applied discipline area	10	31.3
Soft Applied discipline area	13	40.6
Total	32	100.0

Table 24: Frequency of use

	Actual	Percentage
Daily	17	53.1%
Weekly	12	37.6%
Fortnightly	1	3.1%
Monthly	1	3.1%
Rarely	1	3.1%
Total	32	100%

5.3 Descriptive statistics

In order to screen the continuous variables for normality the survey data were checked for any violations of the assumptions underlying the statistical techniques to be used in the present study. The mean number for Beliefs and Practices were 66.28 and 59.97 respectively (Appendix 9), which, as in the survey of non-expert teachers, indicates that beliefs are more strongly held than practices. The 95% Confidence intervals for Beliefs is 63.99 to 68.58, showing a wider range than in

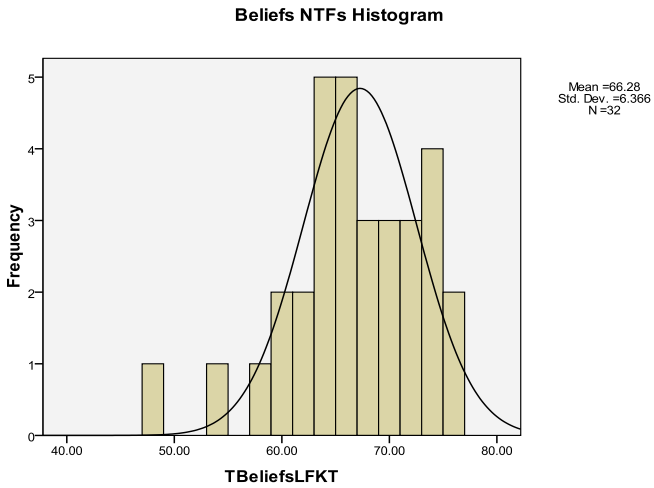
non-expert teachers. The 95% Confidence intervals for Practices ranged from 56.26 – 63.67, again showing a wider range than the non-expert teacher group. This implies less conformity of opinion amongst the 'expert' teacher group. The standard deviation (SD) for Beliefs is 6.37 compared to the SD for Practices of 10.28 suggests there are larger differences in the scores given to the practices questions than the beliefs questions. This finding is similar to that found in the 'non-expert' sample, although greater in magnitude.

The skewness value, has a negative value in Beliefs (-.808) which suggests that scores may be clustered at the high-end of the scale, but is positive in Practices (.403) which suggests the scores are more widely spread. The kurtosis values are a positive in Beliefs (.858) which suggests that scores may be peaked, whereas the Practices kurtosis figure negative (-.268) which suggests that the distribution may be relatively flat with too many cases in the extremes. The histograms provided below for Beliefs and Practices provide a visual representation of the statistics and an analysis of these follow.

5.4 BELIEFS NORMALITY

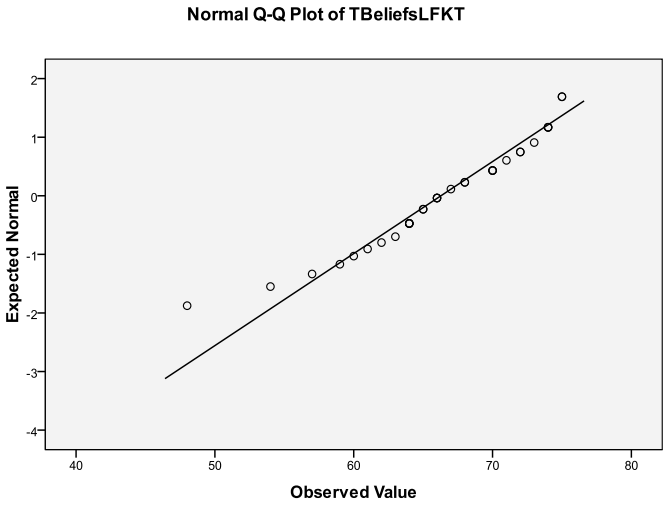
The histogram seen below suggests that the distribution of the data could be said to be normal, but could possibly be bimodal. As this was uncertain further analysis were carried out.

Graph 6: Beliefs responses for expert teachers



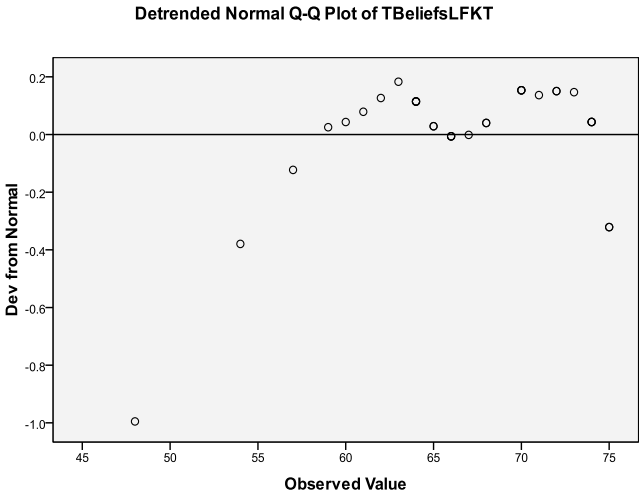
The Kolmogorov-Smirnov statistic has a significance value of 0.200 which, as a non-significant result, indicates normality. This is further supported by the normal probability plots which show a reasonably straight line in the Normal Q-Q plot graph below (Graph 7). This graph shows the observed value for each score and plots it against the expected value from the normal distribution.

Graph 7: Q-Q Plots for expert teachers' Beliefs



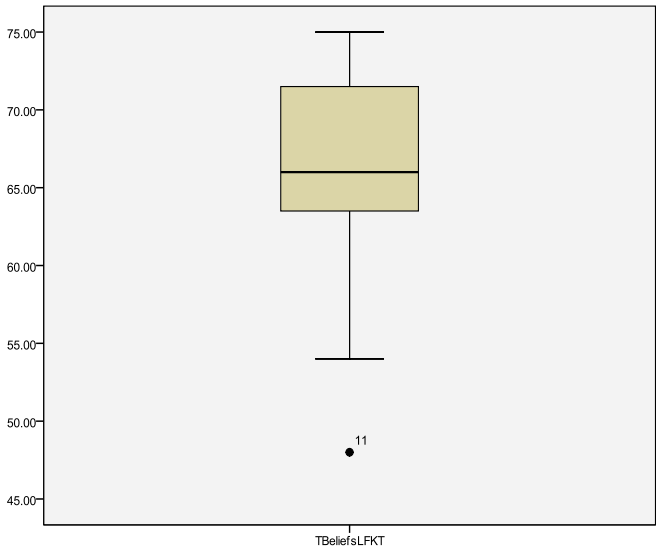
The detrended normal Q-Q plots (Graph 8) plot the deviation of the scores from the straight line. These points do not cluster and most appear to collect around the zero line which again supports the assumption of normality.

Graph 8: Detrended Normal Q-Q Plot of expert teachers' Beliefs



Boxplots (Graph 9) further suggest normality with only one outlier, i.e. respondent number 11. The respondents' scores were checked and found to be valid and so the case was maintained within the data set.

Graph 9 Boxplots for expert teachers Beliefs



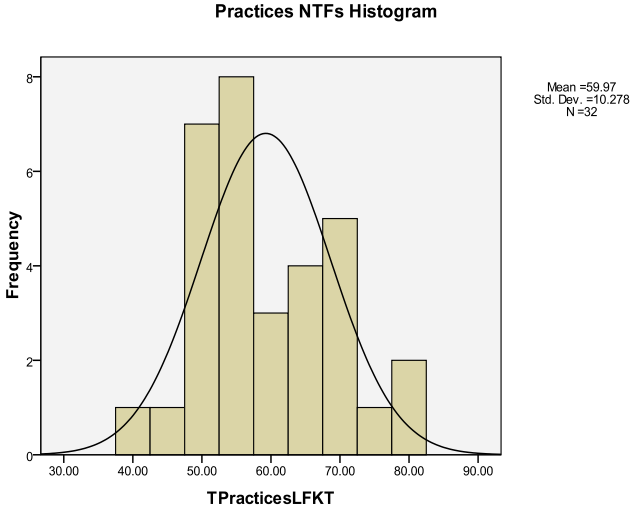
These tests cumulatively indicate that the Beliefs scores for the expert teachers are normal.

5.5 PRACTICES NORMALITY

The histogram shown below (Graph 10) suggests that the assumption of normality has been violated, as the graph appears, once again, to be bimodal**.** Dancey and

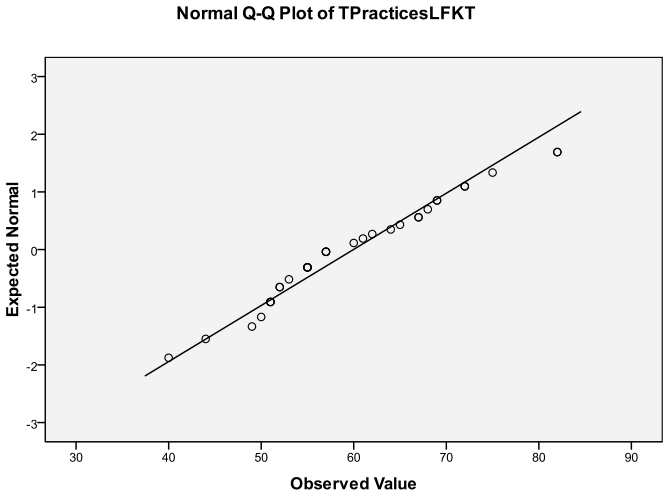
Reidy (2007:81) suggest that such a distribution could indicate two distinct populations within this group.

Graph 10: Practices scores for expert teachers



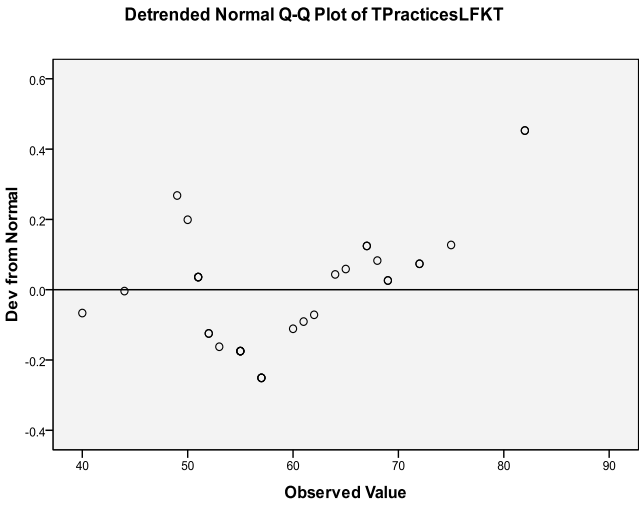
The Kolmogorov-Smirnov statistic however shows a non-significant result (significance value of more than .05), at .086 which indicates normality. This is further supported by the normal probability plots which show a reasonably straight line in the Normal Q-Q plot (Graph 11) below.

Graph 11: Normal Q-Q Plot of Practices variables for expert teachers



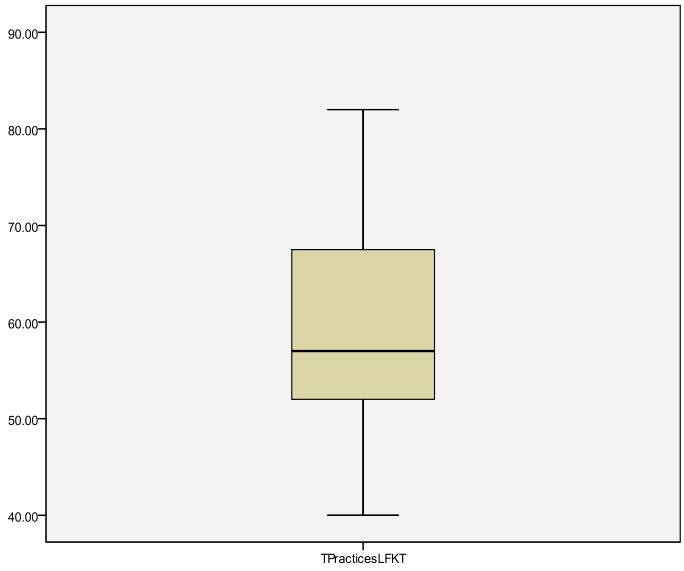
The detrended normal Q-Q plots (Graph 12) show the deviation of the scores from the straight line. As can be seen these points do not cluster and most collect around the zero line which again supports the assumption of normality.

Graph 12: Detrended normal Q-Q plot for expert teachers Practices responses



Graph 13: Boxplots for Practices

This graph indicates there are no outliers in this data.



This data set can therefore be assumed to be normal and the researcher continued with parametric analyses.

5.6 Responses to Beliefs Questions: Range, Means and Standard Deviations

Minimum scores of 2 were found in the Beliefs subsets: 'Training for jobs'; 'Imparting Information'; 'Using media', all identified as KT items in the original research (Gow and Kember 1993). The highest minimum scores are found in 'Interactive Teaching' (6), 'Facilitative Teaching' (6) and 'Motivating students' (5), all LF items in the original research. All other belief scores were 4. The maximum

scores were all 10 apart from 'Imparting Information' which was a 9, which suggests this was the least agreed with item. (Appendix 10)

As with the non-expert teachers all the LF items in beliefs had higher mean scores than the KT scores. The highest mean score was in 'Motivating students' (9.16), followed by 'Facilitative Teaching' (9.06), 'Interactive teaching' (9.0); 'Problem Solving' (8.81) and 'Pastoral interest' (8.78). The lower belief scores are found in KT subsets namely; 'Imparting Information' (4.40) and 'Training for Jobs' (6.75); 'Using Media' (7.03) and 'Knowledge of Subject' (7.81), see Appendix 10. These mean scores therefore imply an orientation in beliefs towards LF.

The Standard Deviations (SD) show a smaller fluctuation in scores on the LF beliefs questions (maximum SD 'Pastoral interest' =1.29, minimum SD 'Interactive teaching' =1.16) than KT beliefs (maximum SD 'Imparting Information' =2.0, minimum SD 'Knowledge of Subject'=1.38), see Appendix 10. These findings are similar to the non-expert group, showing a closer agreement on LF scores and a wider fluctuation in KT scores.

5.7 Responses to Practices Questions: Range, Means and Standard Deviations

The item with the lowest minimum score is 'Pastoral Interest' (2), followed by 'Using media' (3) and 'Interactive teaching' (3). The highest scores are found in 'Motivating Students' (6) and Facilitative Teaching (6), with all other subsets getting a minimum score of 4. The maximum score was 10 for all subsets. See Appendix 10.

As with the non-expert survey it can be seen that most 'practices' mean scores are lower than 'beliefs' scores. The highest mean scores are found in 'Motivating Students' (8.0) and 'Facilitative Teaching' (8.6), which suggests that these were the main uses of online environments by expert teachers. Subsets with the lowest SD, i.e. where there is least variation, are also 'Motivating Students' (1.24) and 'Facilitative Teaching' (1.24) which suggests that these expert teachers are most in agreement about these typically LF items. These two subsets are the same as those found in the non-expert teacher mean scores.

The next highest mean scores are found in 'Using Media' (7.4) and 'Knowledge of Subject' (7.3); these subsets would be classed as KT practices in the original research (Gow and Kember, 1993) but nevertheless appear to be important online practices for expert teachers. The lowest scores are found in 'Pastoral Interest' (6.0) and 'Imparting Information' (6.2). These findings are particularly interesting as

it suggests that expert teachers use online environments least to care for their students' pastoral needs and to transfer information.

SDs generally reveal, as in the non-expert survey, that there are greater fluctuations in the scores on Practices than on Beliefs. The highest SD is 'Pastoral interest' (2.13), which suggests a wider range of scores on this subset than elsewhere, suggesting more variation in response. The next highest SD is in 'Interactive teaching' (2.08) again this suggests a wider range of scores on this subset than elsewhere, suggesting greater variation on these items. This could be illustrative of two subgroups within the expert teacher cohort that was suggested in the histograms (Graph 6 and Graph 10).

So, to summarise, this sample of expert teachers are most likely to use and agree on, motivating students and facilitative teaching practices in online environments. They are more likely to disagree over and least likely to practice, care for their students' pastoral needs and transferring information to them in online environments.

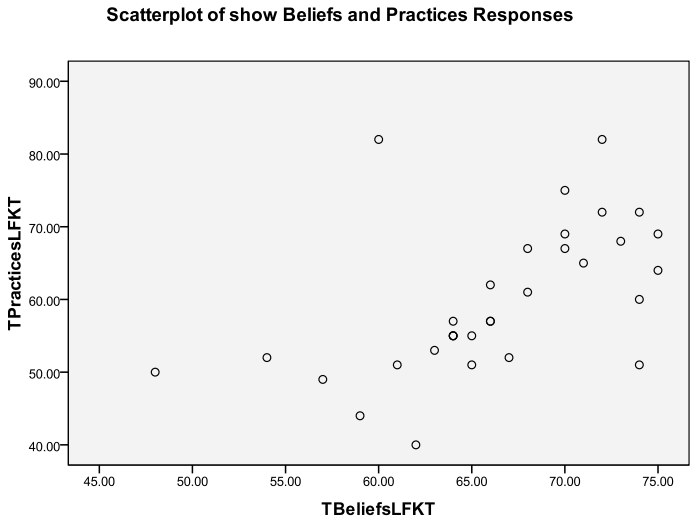
As with the analysis of non-expert teachers a correlation analysis, Pearson product-moment correlation coefficient (*r*), was conducted. This test identifies if there are any relationships between the subsets of beliefs and practices and will provide

information on the strength and direction of that relationship, in addition to its statistical significance.

5.8 Pearson product moment correlation analysis

The scatterplot graph provided below (Graph 14) allows a visual check for any violations of the assumption of linearity and homoscedasticity. As can be seen from this graph an imperfect positive relationship can be seen between beliefs and practices, that is to say, as the score increases with beliefs the score generally increases on practices.

Graph 14: Scatterplot to show direction of expert teachers Beliefs and Practices responses



The relationship between beliefs and practices was investigated using Pearson product-moment correlation coefficient. The Correlations table (Table 25) shows that, unlike in the main survey of non-expert teachers, beliefs and practices are strongly correlated in some cases. Using Cohen's (1988) guidance of 'small' correlations r=.10-.29, a 'medium' correlation where r=.30-.49, and a large correlation where r=.50-1.0, it can be seen that a few of the beliefs variables have a medium or strong correlation with some practice variables.

Table 25: Correlations between Beliefs and Practices N=32

Knowledge Transfer / Teacher-centred items shown in shaded boxes

		PRACTICES								
BELIEFS		Prob. Solvg	Inter-active Teach.	Facil ita-tive Teac h.	Past-oral Int.	Motiv -ating Studs.	Train-ing for Jobs	Using medi a	Impar t Ing Info.	Know - ledge of Subj.
Problem Solving	Pearson Correlation	-.195	.006	.036	-.284	-.063	-.303	-.112	-.449*	-.153
	Sig. (2-tail)	.284	.973	.847	.115	.731	.092	.540	.010	.402
Interactive Teaching	Pearson Correlation	.491**	.360*	.473**	.704**	.423*	.459*	.354*	.231	.448*
	Sig. (2-tail)	.004	.043	.006	.000	.016	.008	.047	.204	.010
Facilitative Teaching	Pearson Correlation	.080	.056	.458**	.220	.083	-.044	-.104	.109	.171
	Sig. (2-tail)	.662	.760	.008	.227	.650	.813	.572	.552	.351
Pastoral Interest	Pearson Correlation	.502**	.208	.163	.730**	.463**	.655*	.292	.362*	.494**
	Sig. (2-tail)	.003	.254	.374	.000	.008	.000	.105	.042	.004
Motivating Students	Pearson Correlation	.307	.150	.190	.598**	.444*	.618*	.286	.246	.550**
	Sig. (2-tail)	.088	.414	.297	.000	.011	.000	.113	.174	.001
Training for Jobs	Pearson Correlation	-.003	.059	.205	.133	.142	.460*	.159	.144	.219
	Sig. (2-tail)	.988	.747	.260	.469	.440	.008	.386	.432	.229
Using Media	Pearson Correlation	.351*	.303	.207	.449**	.614**	.477*	.278	.376*	.509**
	Sig. (2-tail)	.049	.092	.255	.010	.000	.006	.123	.034	.003
Imparting Information	Pearson Correlation	-.391*	-.456**	-.327	-.205	-.285	-.089	-.119	.064	-.150
	Sig. (2-tail)	.027	.009	.067	.260	.113	.630	.517	.729	.413

Knowledge of Subject	Pearson Correlation	.298	.310	.540**	.253	.339	.452*	.430*	.140	.377*
	Sig. (2-tail)	.098	.085	.001	.162	.058	.009	.014	.446	.033

Unlike the non-expert teacher group, a number of correlations between beliefs and practices were found. In order to consider these in detail each subset is therefore discussed separately below.

Problem Solving Beliefs have a small negative correlation with Problem Solving Practices which is not significant. They do however have statistically significant (p<.01) moderate negative correlation with 'Imparting Information' practices (*r*= -.449, p.010), which implies that expert teachers with strong beliefs in problem solving but do not associate this with 'Imparting Information'.

Interactive Teaching Beliefs have a statistically significant and moderate positive relationship with 'Interactive teaching' Practices (*r*=.360 p<.004) which suggests some alignment between beliefs and practices**.** Interactive Teaching Beliefs also have a statistically significant and large correlation with other practices too. For example it has a statistically significant large positive correlation with Pastoral Interest (*r*=.704, p<.001). It has other medium correlations with Problem Solving (*r*=.491 p<.004); Motivating Students (*r*=.423 p.016); Training for Jobs (*r*=.459 p<.008); and Knowledge of Subject (*r*=.448 p<.01). These correlations imply that expert teachers who hold strong beliefs in 'Interactive teaching' associate this with

the practices of 'discussion' and 'participation', but also relate it closely to caring for one's students. This 'caring' appears to include caring for their working futures.

Facilitative Teaching Beliefs have a statistically significant medium positive relationship with Facilitative Teaching Practices, (r=.458, p<.008). This shows clear alignment between beliefs and practices, i.e. those who hold strong beliefs in 'Facilitative teaching' are able to reflect this in their online teaching. Expert teachers appear to be able to align their belief 'Teaching is about providing an environment in which students are encouraged to do the learning themselves', with their practice 'One of my principal aims in the VLE is to provide an environment in which students are helped to 'learn for themselves' rather than be taught.' There are no other significant correlations with other subsets.

Pastoral Interest Beliefs have a statistically significant and large positive correlation with Pastoral Interest Practices (r=.730, p<.001) which shows that those who have strong beliefs about 'Pastoral interest' are able to practice this in an online environment. This illustrates another alignment between Beliefs and Practices in this particular subset. They also have statistically significant large positive correlations with Training for Jobs Practices (r=.655 p<.001); and Problem Solving Practices (r=.502 p<.003). A concern for students' welfare then seems to be associated with online practices that support students with specific vocational

information and enable students to use this to solve problems. There are also statistically significant medium correlations with Motivating Students (r=.463, p<.008); and Knowledge of Subject (r=494, p<.004). In their care for students therefore, NTFS do not appear to distinguish between LF and KT approaches.

Motivating Students Beliefs has a statistically significant medium positive relationship with Motivating Students Practices (r=.444, p<.011). Once again an alignment between beliefs and practices can be seen to some extent. There is also a statistically significant large positive relationship with Pastoral Interest (r=.598, p<.001); Training for Jobs (r= .618 p<.001); and Knowledge of Subject (r=.550 p<.001). This finding suggests that NTFs who believe in motivating students do this by showing that they care for them and preparing them for future careers through the provision of expert knowledge.

Training for Jobs Beliefs has a statistically significant moderate correlation with Training for Jobs Practices (r=.460 p<.008). Once again beliefs and practices are more closely aligned than that of non-expert teachers.

Using Media Beliefs is not statistically positively correlated with using media practices but it does have a statistically significant large positive relationship with Motivating students (r=.614 p<.001); and Knowledge of Subject (r=.509 p<.001). It

also has a statistically significant medium positive relationship with 'Training for jobs' (r=477, p<.006); and Pastoral Interest (r=.449; p<.010). This finding suggests that NTFs are using media to motivate students and to present their expert knowledge. Once again, preparing students for work appears to be part of the caring for students' well-being.

Imparting Information Beliefs has little to no correlation with 'Imparting information' Practices. It does however have a statistically significant moderate negative correlation with Interactive Teaching (r=-.456 p<.009). Once again this implies that NTFs do not associate giving information with 'interaction' and engagement with learning.

Knowledge of Subject Beliefs has a statistically significant and moderate positive relationship between Knowledge of Subject Practices (r=.377, p<.033). It also has a statistically significant large correlation with 'Facilitative Teaching' (r=.540 p<.001), a statistically significant medium correlation with 'Training for jobs' (r=.452 p<.009); and 'Using Media (r=.430, p<.014). This finding implies that NTFS believe that their own expert knowledge is an important ingredient to facilitate learning. NTFS may perceive a symbiotic relationship between their own knowledge and preparing their students for work.

The Pearson product moment correlations therefore imply that, unlike in the case of non-expert teachers, some of the subsets are highly correlated with each other, that is to say as scores increase in the beliefs subset the scores in the practices subset increase also. Large correlations are found in corresponding beliefs and practices for 'Pastoral Interest' (.730), but 'Pastoral Interest beliefs are also highly correlated with 'Problem solving' (.502)and 'training for jobs' (.655); in addition to other correlations with 'motivating students' (.463), 'knowledge of subject' (.494) and 'imparting information' (.362).

Other moderate correlations are found between the following corresponding beliefs and practices subsets: 'facilitative teaching' (.458); 'motivating students' (.444); 'training for jobs' (.460); interactive teaching' (.360); 'knowledge of subject' (.377). Again, however, most of these subsets also correlate with other subsets.

Other strong correlations exist between subsets. Taking just the large correlations for example: Interactive teaching beliefs have a high correlation with pastoral interest practices (.704); motivating student beliefs have a high correlation with pastoral interest practices (.598), training for jobs practices (.618) and knowledge of subject practices (.550); using media beliefs have a high correlation with motivating students practices (.614) and knowledge of subject practices (.509)

The Pearson product moment correlation shows then, that many of the beliefs and practices pairs are correlated, but not necessarily correlated with their own subset pair. The subset pairs which are statistically significant and aligned between beliefs and practices are 'facilitative teaching'; 'pastoral interest'; motivating students; and 'training for jobs'. Taking the 'motivating students' subset for example, the standard deviation for the beliefs and practices scores implied that expert teachers were more likely to agree on this belief and corresponding practice than other corresponding subsets. The correlations reveal that 'motivating students' beliefs are only moderately aligned with 'motivating students' practices (.444) and are more strongly related to 'pastoral interest' practices (.598), 'training for jobs' practices (.550) and 'knowledge of subject' (.618) practices.

Taking the 'facilitative teaching' subset as another example, however, it can be seen that the mean scores and standard deviations revealed that the expert teachers were more likely to agree on the belief scores for 'facilitating teaching' and the standard deviation illustrated that they were also more likely to agree about this practice. The correlations reveal that 'facilitative teaching' beliefs are only significantly correlated with 'facilitative teaching' practices, which suggests that this subset provides a clearly understood belief with corresponding online teaching practice.

In the KT beliefs 'Using media' beliefs are not highly correlated with their corresponding subset. 'Using media beliefs are however highly correlated with 'motivating students' (.614) and 'knowledge of subject' (.509) and have a moderate correlation with 'pastoral interest' (.449), 'training for jobs' (.477). This finding suggests that NTFs are using media to motivate their students learning within the online environment. The 'Imparting Information' beliefs subset is not correlated with the 'imparting information' practices but is negatively moderately correlated with 'interactive teaching' (-.456).

These correlations then show a complex view of the associations between subsets. Clearly, compared to non-expert teachers, expert teachers' beliefs and online practices are more aligned particularly in the subsets facilitative teaching, pastoral interest, motivating students and training for jobs.

As with the analysis of non-expert teachers it was decided to conduct a factor analysis in order to reduce the data to more manageable proportions as in Norton et al (2005). Factor analysis reduces a data set by identifying groups among the inter-correlations within the variables and provides the researcher with 'factors' which show where variables cluster together.

5.9.1 Factor Analysis – Expert teachers' BELIEFS

The 9 items on the Beliefs scale were subjected to principal component analysis (PCA) using SPSS Version 17. Prior to performing PCA the suitability of data for factor analysis was assessed. Inspection of the correlation matrix (Table 25) reveals a large number of coefficients have a value of .3 or above. Correlation coefficients can be less reliable when calculated from smaller samples. Tabachnick and Fidell (2007:613) state that the required sample size also depends on magnitude of population correlations and number of factors: 'if there are strong correlations and a few, distinct factors, a smaller sample size is adequate.'

As the Kaiser-Mayer-Olkin (KMO) Bartlett's Test of Sphericity value (Table 26) reached statistical significance (p >0.05) at .655 this supports the factorability of the correlation matrix.

Table 26: EXPERT TEACHERS' BELIEFS KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.655
Bartlett's Test of Sphericity	Approx. Chi-Square	331.318
	Df	153
	Sig.	.000

Tabachnick and Fidell (2007:613) state that

> 'As long as PCA and FA are used descriptively as convenient ways to summarise the relationships in a large set of observed variables, assumptions regarding the distributions of variables are not in force.'

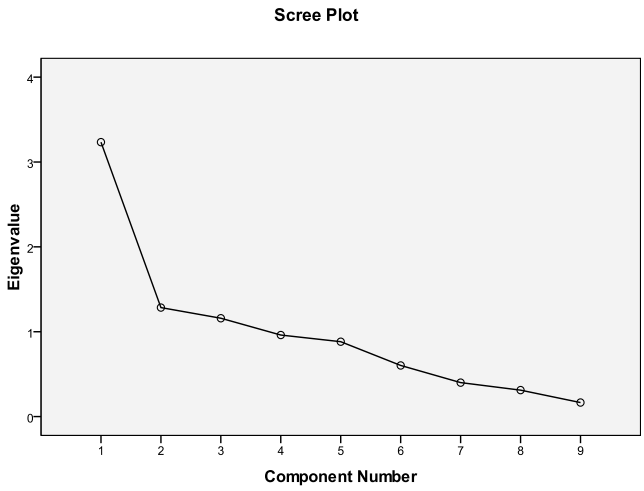
Principal Component analysis (Table 27) revealed the presence of three factors with eigenvalues exceeding 1, explaining a cumulative total of 63% of the total variance.

Table 27: EXPERT TEACHERS' BELIEFS Total Variance Explained

Total Variance Explained			
Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3.234	35.932	35.932
2	1.284	14.272	50.204
3	1.159	12.876	63.080
Extraction Method: Principal Component Analysis.			

Castell's (1966) scree test supports the retention of three factors for further investigation.

Graph 15: Scree Plot showing expert teachers' Beliefs



However, on viewing the rotated component matrix one factor had only one item, Problem-solving, loading on it and therefore should be rejected. 'Factors that are defined by just one or two variables are not stable' (Tabachnick and Fidell 2007:615). The factor analysis was therefore run again on just two factors. The varimax rotated table can be seen below (Table 28)

Table 28: EXPERT TEACHERS' BELIEFS Rotated Component Matrix
Knowledge Transfer / Teacher-centred items shown in shaded boxes

	Techno-Facilitation	Techno-Transfer
	1	2
Pastoral Interest	.859	
Using Media	.802	
Motivating Students	.787	
Interactive Teaching	.782	
Problem Solving	.682	
Facilitative Teaching		-.613
Imparting Information		.618
Training for Jobs	.553	.521
Knowledge of Subject	.507	

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 3 iterations

Naming the Factors

Belief Factor 1: 'Techno-Facilitation'. This factor has been so named as it is dominated by high loadings on the 'Learning Facilitation' (LF) items. The exception to this is the using media subset which Norton et al (2005) found in their study was also linked with LF approaches, suggesting a principled use of media. The other KT items which have loaded on this first factor are 'Training for Jobs' and 'Knowledge of Subject'. The loading values in these subsets are lower but they are still associated with preparing students for work. This will be discussed in the following chapter.

Belief Factor 2: 'Techno-Transfer'. This factor has been so named because the loadings indicate that these subsets are <u>not</u> about facilitation, but about knowledge transmission, specifically concerned with transferring information and associated with preparing students for work.

Principal axis factoring, parallel analysis and Direct Oblimin rotation were also carried out and found to contain similar patterns of loadings.

5.9.2 Factor Analysis - National Teaching Fellows: PRACTICES

The Kaiser-Mayer-Olkin (KMO) Bartlett's Test of Sphericity value reached statistical significance (p=<.05) at .763 which supports the factorability of the correlation matrix (Table 29)

Table 29: EXPERT TEACHERS' PRACTICES KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.763
Bartlett's Test of Sphericity	Approx. Chi-Square	123.045
	Df	28
	Sig.	.000

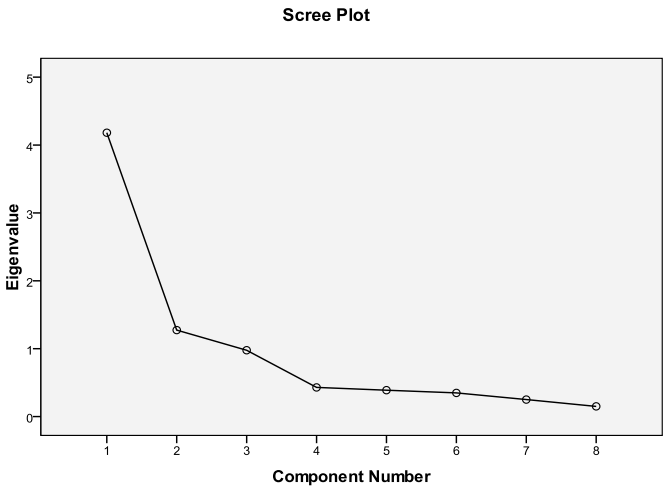
Principal Component analysis revealed the presence of two factors with eigenvalues exceeding 1, explaining a cumulative total of 68.2% of the total variance (Table 30).

Table 30: EXPERT TEACHERS' PRACTICES Total Variance Explained

	Initial Eigenvalues		
Component	Total	% of Variance	Cumulative %
1	4.181	52.268	52.268
2	1.274	15.925	68.193
Extraction Method: Principal Component Analysis.			

Castell's (1966) scree test (Graph 16) supports the retention of two factors for further investigation.

Graph 16 Scree plot to show expert teachers' responses to Practice questions



Varimax rotation was performed with loadings below .4 suppressed to enable clarity of the loadings.

Table 31: EXPERT TEACHERS' PRACTICES Varimax Rotated Component Matrix
Knowledge Transfer / Teacher-centred items shown in shaded boxes

	Component	
	1 **Techno-Facilitation**	**2** **Caring KT**
Imparting Information		.899
Interactive Teaching	.898	
Motivating Students	.723	
Training for Jobs		.725
Facilitative Teaching	.707	
Pastoral interest		.708
Problem Solving	.621	
Using Media	.555	
Knowledge of Subject	.626	.547

Extraction Method: Principal Component Analysis.

Rotation method: Varimax with Kaiser Normalisation

a. Rotation converged in 3 iterations

Naming the Factors

Factor 1: 'Techno-Facilitation'. This factor was so named because once again the loadings for the LF items are higher than all KT items. Again 'Use of media' is associated with LF practices. 'Knowledge of Subject' is also associated with this factor which, in line with their Beliefs, suggests that expert teachers consider their own knowledge to be important to their students' learning.

Factor 2: 'Caring KT' (Caring Knowledge Transmission). This factor was so named because it has high loading values on KT items (Training for Jobs and Imparting Information) and includes 'Knowledge of Subject' but also has a high loading value on Pastoral interest. This implies that this cluster is concerned with knowledge transmission, but is associated with a caring concern for the student. Kember and Kwan (2000) found a similar adjustment to their subsets and named this group 'Caring Knowledge Transmission'.

Direct Oblimin rotation, parallel analysis and principal axis factoring were all conducted again finding were similar to that found in PCA.

To discover whether there were any significant differences in the mean scores for beliefs and practices a paired-sample t-test was conducted. This test is used as the same respondents answered questions on two different aspects, or conditions, of their teaching, i.e. beliefs and practices. This test makes an assumption of normality and this has been explored for both Beliefs and Practices and has been found to be present in both. Pallant (2005:198) reveals that the scores in social science research are rarely 'nicely distributed', but states that nevertheless such tests are 'reasonably 'robust' or tolerant of this [normality] assumption'. The test presents information as to whether there is a statistical difference in the mean scores between the two conditions.

5.10 Paired sample t-tests

A significant difference ($p<.0001$) was found between the total score for beliefs was 66.28 (compared to non-expert teachers, 66.84) and the total score for practices 59.99(compared to non-expert teachers, 53.27), see Appendix 10. This finding illustrates that expert teachers are more likely to adopt a range of practices in online learning environments.

The statistically significant ($p < .0001$) mean score for LF Beliefs was 44.81 (compared to non-expert teachers 39.42), compared to the mean score for LF Practices 36.34 (compared to non-expert teachers 27.32). This represents a mean difference of 8.47 (compared to a mean difference for non-expert teachers of 12.09). This illustrates that expert teachers have stronger LF pedagogical beliefs and online teaching practices and that they are more closely aligned than non-expert teachers.

The mean score (statistically significant $p<.027$) for KT Beliefs was 26.00 (compared to non-expert teachers KT beliefs 27.42), compared to a KT practices mean score 27.94 (compared to non-expert teachers 25.95). This represents a mean difference of -1.94 (compared to non-expert teachers mean difference of +1.47). This shows that the biggest differences between beliefs and practices exist between LF beliefs and LF Practices. This illustrates that even though expert teachers have weaker KT pedagogical beliefs, they still exploit the online environment for KT practices. This finding illustrates that university teachers, regardless of expertise, use online environments for KT purposes.

The paired samples statistics (Table 32) show the difference between beliefs and practices scores on an item-by-item basis and shows which score is significantly higher.

Table 32. Paired Sample T-Test to compare responses for expert teachers' BELIEFS and PRACTICES scores

Knowledge Transfer / Teacher-centred items shown in shaded boxes

Pairs	Mean	T	Sig. (2-tailed)	Confidence Intervals	t^2	Eta squared
Problem Solving		4.68	.000	1.0 – 2.6	21.90	0.41
Belief	8.81					
Practice	6.97					
Interactive Teaching		6.42	.000	1.5 -3.0	41.21	0.57
Belief	9.00					
Practice	6.75					
Facilitative Teaching		1.88	.070	-0.04 – 1.0	3.53	0.10
Belief	9.06					
Practice	8.63					
Pastoral interest		10.67	.000	2.2 – 3.3	113.84	0.99
Belief	8.78					
Practice	6.00					
Motivating Students		5.14	.000	0.7 – 1.6	26.41	0.46
Belief	9.16					
Practice	8.00					
Training for Jobs		-.67	.511	0.9 – 0.5	-1.34	-0.04
Belief	6.75					
Practice	6.97					
Using Media		-1.07	.294	-1.1 – 0.4	-2.14	-0.07
Belief	7.03					
Practice	7.44					
Imparting Information		-4.18	.000	-2.7 - -0.9	-8.36	-0.37
Belief	4.41					
Practice	6.22					
Knowledge of Subject		1.61	.118	-0.1 – 1.1	2.59	0.07
Belief	7.81					
Practice	7.31					

As can be seen, in four of the five LF subsets (Problem Solving, Interactive Teaching, Pastoral Interest, and Motivating Students) the belief score is significantly different to the practice score. For three of the four KT subset scores (Training for Jobs, Using Media and Knowledge of Subject) there were no significant differences between beliefs and practice scores; the only exception was the, 'Imparting Information' subset where the belief score (4.41) is significantly lower than the practice score (6.22). This, therefore, shows a close alignment between expert

teachers KT pedagogical beliefs and practices concerning training for jobs, using media and knowledge of subject.

In the analysis of mean scores it would therefore appear that expert teachers hold strong LF beliefs but, other than with 'Facilitative Teaching' do not practice these beliefs to the same extent in online environments. Highest mean practice scores are in 'Facilitative Teaching' (8.63) and 'Motivating Students' (8.0) suggesting that they are most likely to use these LF approaches, but not as much as their belief score would imply. The next highest mean scores shows a mix of LF and KT approaches, these are: 'Using Media' (7.44); 'Knowledge of Subject' (7.31); 'Problem Solving' (6.97); 'Training for Jobs' (6.97); 'Interactive teaching' (6.75); 'Imparting Information' (6.22) and 'Pastoral interest' (6.0).

The Confidence intervals shown in Table 32 indicate a wider range between the lower and upper figure, than that seen in the non-expert sample. This means that these figures have a broader range and are consequently less persuasive and should, therefore, be treated cautiously.

Calculating the effect size for the paired-samples

The result found in the t-test shows that the difference obtained in the two sets of scores is unlikely to have occurred by chance. In order to understand the

magnitude of the difference, a commonly used (Pallant, 2005:212) effect size statistic, eta squared, was calculated.

$$\text{Eta squared} = t^2 / t^2 + N - 1$$

Following Cohen (1988) cited in Pallant (2005:212) interprets eta squared values as .01=small effect; .06=moderate effect, .14=large effect. The effect size of the differences between the scores on beliefs and practices questions are therefore small in the categories 'Training for Jobs' (-0.04) and 'Using Media' (-0.07), moderate in 'Knowledge of Subject' (0.07) and 'Facilitative Teaching' (0.10). The magnitude of the difference in means in all other cases was large.

This gap appears to be less wide than the non-expert teacher gap where none of the beliefs and practices were strongly aligned (see table 9) and the differences between all the subsets were found to be significantly different. Nevertheless, both expert and non-expert groups do not consistently practice their LF beliefs (apart from in the case of experts' online practice of Facilitative teaching). Expert teachers however do appear to be more able to carry out their KT beliefs, even though these beliefs are held less strongly than their LF beliefs.

The rank order of the beliefs and practices items is also revealing (Table 33). For example 'Facilitative Teaching' and 'Motivating Students' are ranked 1 and 2 for Beliefs and Practices for expert teachers that is similar to the rank order seen in the

non-expert sample. The biggest gap seen in the rank order of beliefs compared to practices is that expert teachers rate 'interactive teaching ' as their third highest held belief, but their seventh held practice. In the non-expert sample this gap is even larger with their most highly held belief being 'interactive teaching' which is their least (9^{th}) held practice. So even though this subset illustrates the largest gap between beliefs and practices for both groups the gap is much larger in non-expert teachers.

Other interesting items are the rank order of 'using media' which is 7^{th} for expert teachers in terms of beliefs, but 3^{rd} in rank order in terms of practices. This suggests a use of media within an online environment in order to manage the teaching there. 'Using media' for non-expert teachers is not a strongly held belief (8^{th} rank order), nor a popularly used practice (5^{th} rank order). The lowest held (9^{th}) belief for expert teachers is 'imparting information' and they rank this 8^{th} in their practice, followed only by 'pastoral interest' (9^{th}). So expert teachers are illustrating here that they do not have imparting information beliefs and they rarely practice this in their online environments. Non-expert teachers ranked 'imparting information' beliefs last (9^{th}), but their practices were ranked at 4^{th} in the same area. Once again we see expert teachers have more closely aligned beliefs and practices than non-expert teachers.

Table 33. Rank Order comparison of expert and non-expert teachers' beliefs and practices.

Knowledge Transfer / Teacher-centred items shown in shaded boxes

		Non-Expert Teachers		Expert Teachers	
		Beliefs	**Practices**	**Beliefs**	**Practices**
Learning Facilitation	**Interactive Teaching**	**1**	9	**3**	7
	Mean scores	9.06 Strongly Agree	5.05 Undecided	9.00 Strongly Agree	6.75 Undecided
	Motivating students	**2**	2	**1**	2
	Mean scores	8.92 Strongly Agree	7.16 Agree	9.16 Strongly Agree	8.00 Agree
	Facilitative Teaching	**3**	1	**2**	1
	Mean scores	8.91 Strongly Agree	7.52 Agree	9.06 Strongly Agree	8.63 Agree
	Problem Solving	**4**	6	**4**	5
	Mean scores	8.78 Strongly Agree	6.16 Undecided	8.81 Strongly Agree	6.97 Undecided
	Pastoral Interest	**5**	8	**5**	9
	Mean scores	8.21 Strongly Agree	5.19 Undecided	8.78 Strongly Agree	6.00 Undecided
Knowledge Transmission	**Knowledge of Subject**	**6**	3	**6**	4
	Mean scores	7.84 Agree	6.99 Undecided	7.81 Agree	7.31 Agree
	Training for Jobs	**7**	7	**8**	6
	Mean scores	6.88 Undecided	5.98 Undecided	6.75 Undecided	6.97 Undecided
	Using media	**8**	5	**7**	3
	Mean scores	6.68 Undecided	6.23 Undecided	7.03 Agree	7.44 Agree
	Imparting Information	**9**	4	**9**	8
	Mean scores	6.02 Undecided	6.75 Undecided	4.41 Undecided	6.22 Undecided

Summary

Factor analysis therefore suggests that there are two distinct groups of associations in experts' online teaching practice approaches, one for LF and the other for KT.

This mirrors to a large extent the beliefs factor analysis which was divided between

LF and KT. In practices the teachers' own expert knowledge is also associated with supporting student learning and with knowledge transfer; in Beliefs 'training for jobs' is associated with learning facilitation and knowledge transmission. This will be discussed in depth in the following chapter.

5.11 Expert teachers MANOVAS

A series of one-way multivariate analysis of variance (MANOVA) were conducted to explore differences between the DVs Beliefs Learning Facilitation; Beliefs Knowledge Transfer; Practices Learning Facilitation and Practices Knowledge Transfer with each of the IVs.

The data was checked to ensure that it conformed to the assumptions made by the test. The sample size needs to be sufficiently large and have more cases in each cell than the number of DVs (Pallant 2005:249) and as there are 32 cases and 4 dependent variables (made up from 18 variables collapsed into 9 subsets on each of the beliefs and practices scales), the complexity of this instrument suggests that this assumption may not have been met.

The assumption of normality requires a sample size of at least 20 in each cell to ensure 'robustness' (Pallant 2005:249). Mahalanobis distances were checked to ensure normality. The Mahal. Distance maximum value equals 14.83 and the

number of DVs is 4. This value is compared to a 'Critical value' of 18.47 (Pallant 2005:249). As the Mahal. Distance is smaller than this critical value it suggests that there are no 'multivariate outliers' in the data file.

Results

MANOVAs were run against all the independent variables and were found to have no statistical significance on any of the Beliefs or Practices factors. These include Gender; Subject taught; Teaching Qualification; HEA Membership; Online Development; Teaching and Learning Development; Discipline and PrePost '92; Age Range; and Years Teaching.

As Pallant (2005:255) suggests 'MANOVA works best when dependent variables are only moderately correlated', with which Tabachnick and Fidell (2007:251) concur 'The multivariate test has much less power when the correlation is positive, zero, or moderately negative'. The correlation analysis suggested high multiple correlations across variables, suggesting the possibility of multicollinerarity in this data set, that is to say some of the subsets are combinations of other subsets. This appears to be unlikely however as the highest loading was 0.7. Pallant (2005) suggest multicollinerarity when there are multiple loadings above 0.8 or 0.9. Multicollinerarity occurs where some variables or subsets are made up of subscales of other variables or subsets, suggesting that they are essentially measuring the same thing. A more likely culprit for this problem is a lack of power in the cases-to-DVs ratio. The design of the instrument is complex and this particular sample is

relatively small by comparison. Tabachnick and Fidell (2007:250) advise that 'one likely outcome of reduced power is a non-significant multivariate F, but one or more significant univariate Fs (and a very unhappy researcher)'. Due to the lack of power it was therefore impossible to identify any significant variables that may account for the results.

5.13 Further investigations of expert approaches

The early analysis of the expert teacher group showed that there may be two distinct sub-groups responding to this survey from within the expert sample (see graph 6 and 10) and in some of the tests outlined above the expert teacher group do not appear to be homogenous. For three of the four KT subsets the division between them appears to be less distinct than the non-expert group. For example in the Pearson product-moment correlations and factor analysis the KT item 'Using media' was associated with LF approaches, such as 'pastoral interest' and 'training for jobs'; 'Knowledge of Subject' was be related with both KT and LF approaches; and 'Training for Jobs' also appears to be associated with both approaches.

The KT subset for 'Imparting Information' appears to be the only item that clearly divides the group; it was not significantly positively correlated with any other subset and in factor analysis of beliefs and practices it was only associated with other KT items as defined in the original research (Gow and Kember 1993) and in the paired

sample t-tests it was the only significantly different KT belief and practice score. A visual sort of these respondents from the data set revealed that of the 8 respondents who scored the 'Imparting Information' items highly (i.e. above 5), 6 taught science subjects (2 x Chemistry, 2 x Computing, 1 x Maths, 1 x Biology). Of the other two respondents one taught 'German' and the last taught 'Business' although noted that they now held a management position and consequently did little teaching. This is an interesting finding and supports Biglan's (1973) classification of disciplines, suggesting that science teachers view knowledge more concretely and may believe that it is possible to 'impart information'. It would appear that among this sample of expert teachers those whose disciplines perceive knowledge as more certain are more likely to believe in and practice KT teaching approaches.

Using 'Imparting Information' as the delineator for the group of expert teachers, it is interesting to see how this impacts upon the paired sample t-test results. In uncoupling these two sub-groups it can be seen that beliefs and practices become more closely aligned for each group of teachers.

Table 34: Comparing Expert teachers on 'Imparting Information' subset

Subsets	High 'Imparting information' Mean Score	Sig. (2 tailed) II High mean	Low 'Imparting information' Mean Score	Sig. (2 tailed) II Low mean
Problem Solving		.005		.003
Belief	9.1		8.7	
Practice	6.3		7.1	
Interactive Teaching		.001		.000
Belief	8.7		9.1	
Practice	5.5		7.2	
Facilitative Teaching		.197		.213
Belief	8.5		9.3	
Practice	7.8		9.0	
Pastoral interest		.000		.000
Belief	8.8		8.8	
Practice	5.5		6.2	
Motivating Students		.003		.001
Belief	9.3		9.1	
Practice	7.8		8.0	
Training for Jobs		.285		.333
Belief	7.1		6.6	
Practice	6.8		7.0	
Using Media		.815		.252
Belief	7.0		7.0	
Practice	7.3		7.5	
Imparting Information		.351		.000
Belief	6.9		3.6	
Practice	6.3		6.2	
Knowledge of Subject		.275		.218
Belief	7.9		7.8	
Practice	7.4		7.2	

In table 34 it can be seen that for expert teachers with a low mean score for 'imparting information' beliefs there is a significant difference between their beliefs and practices scores in LF subsets 'Problem Solving', 'Interactive Teaching', 'Pastoral Interest' and 'Motivating Students', but, in all cases, their mean scores were much

higher in each LF item; so it would appear that these teachers are more likely to enact their LF beliefs whilst teaching online. The only KT subset which is significantly different was the 'Imparting Information' subset. Once again, however, other KT items are closely aligned.

For expert teachers who have a high mean score for 'Imparting Information' beliefs it can be seen that there is far less alignment between their LF beliefs and practices. However, their KT items are more closely aligned. It can be seen therefore that their practices are more focussed upon transmission of knowledge rather than learning facilitation. This further analysis of the expert teacher group then shows that there appear to be two distinct sub-groups amongst expert teachers, most clearly delineated by their perception of teaching as 'imparting information'.

The research instrument provided the quantitative data seen above. The questionnaire also provided open boxes for expert teachers to leave additional information which may help to put their answers in context. The analysis of these comments follows.

5.14 Analysis of qualitative data

Of the 33 responses received from the National Teaching Fellows, a total of 19 comments were recorded, totalling 662 words. Unlike the non-expert sample the majority of these comments were positive. The 'miscellaneous' comments were

largely comments clarifying the reasons for responses. A breakdown of the nature of these comments can be found below (Table 35)

Table 35: Expert teachers' comments

Type of comment	No. of contributions
Negative	4
Positive	9
Neutral	1
Miscellaneous	5
TOTAL	19

Negative remarks

Even though the majority of remarks were positive in nature, there were 4 negative comments. These comments differ from the non-expert sample as their frustration is not with the technology but with the management of their universities. For example:

> 'Uni/Dept give priority to online environments to save money, not for pedagogical reasons. 'Uni & dept unwilling to recognise prep time required upfront to move to greater use of online environments'
>
> 'In my institution priority is given to research and generation of research income; teaching and learning - much trumpeted though it is - comes a clear second!'
>
> 'innovation costs and HEIs need to see that taking risks and exploring the potential with these technologies with students and colleagues should be encouraged and valued'
>
> 'I have an (increasingly?) ambivalent relationship with new technologies! I think we need to be careful to use 'horses for courses'.....appropriate new technologies for appropriate courses, tasks etc. We need to be strong

enough to say 'no powerpoint here'! To use new technologies to serve students, staff, teaching & learning....not the other way round'

Positive remarks

Of the positive remarks made these can be categorised in two main areas of competency with technology and relevance to their work and learning.

Competence with the pedagogical use of technology

'coming to terms with wikis at the moment; using it to engage academics about web 2.0!'

'I am a bit of a gadget freak. I do draw a line between technologies for social use and that for educational use. I keep my online identities separate. I also don't subscribe to technology for technology's sake - I will use the most efficient tools available; these may be technological in nature. I think we need to avoid trying to appropriate students' online social life for our own ends.

'There is a lag for on-line learning very similar to the lag with skills and teaching & learning. Once folks catch-on to the idea it tends to go more smoothly.'

'I don't need to learn to use new technologies for my teaching at teh [sic] moment as I have learnt the ones I require for current scaffolding of student learning designs. I might need to learn new technologies at the end of the academic year after curriculum review in which case I would spend time learning them. It is the learning design that underpins the technologies I make use of.'

Relevance

'I am responsible for a number of wholly online programmes and think this is a strategically important area for teaching and learning'.

5.15 Summary of expert teacher group

The quantitative and qualitative analysis here then supports H_1 and shows that

expert teachers beliefs and practices are more closely aligned than non-expert

teachers' beliefs and practices, evidence for this can be found in the Pearson product-moment correlations and in their commentary they express interest and enthusiasm for the use of technology, but synthesise this with appropriate pedagogical use, i.e. with the aim of enhancing student learning.

The results also support H_2 as the 'gap' found between non-expert teachers' pedagogical beliefs and online teaching practices is greater than the gap found between expert teachers' pedagogical beliefs and online teaching practices. Evidence for this can be found in the means and standard deviations and the paired sample t-tests. Nevertheless the paired sample t-tests showed that expert teachers' do still have some gaps between their mean scores for beliefs and practices. The commentary provided by expert teachers above may help to understand the reasons for these gaps as expert teachers express some frustration with the lack of priority given to learning and teaching and technology use within their universities.

5.16 Comparing Expert and non-expert teachers pedagogical beliefs and online teaching practices

In Table 36 a comparison of expert and non-expert teachers' paired t-tests can be found. This 'gap' has also been found to narrow for expert teachers when their responses are further delineated against their perception of teaching as 'Imparting Information'.

Table 36: Comparing Expert and Non-Expert teachers' Beliefs and Practice means

Knowledge Transfer / Teacher-centred items shown in shaded boxes

Non-expert Teachers						Expert Teachers				
Pairs	Mean	T	Sig. (2-tailed)	t ²	Eta squared	Mean	t	Sig. (2-tailed)	T ²	Eta squared
Problem Solving		27.71	.000	767.84	0.59		4.68	.000	21.90	0.41
Belief	8.78					8.81				
Practice	6.16					6.97				
Interactive Teaching		45.36	.000	2057.52	0.80		6.42	.000	41.21	0.57
Belief	9.06					9.00				
Practice	5.05					6.75				
Facilitative Teaching		15.21	.000	231.34	0.30		1.88	.070	3.53	0.10
Belief	8.91					9.06				
Practice	7.52					8.63				
Pastoral interest		33.30	.000	1108.90	0.68		10.67	.000	113.84	0.99
Belief	8.21					8.78				
Practice	5.19					6.00				
Motivating Students		21.56	.000	464.40	0.47		5.14	.000	26.41	0.46
Belief	8.92					9.16				
Practice	7.16					8.00				
Training for Jobs		10.59	.000	112.15	0.18		-.67	.511	-1.34	-0.04
Belief	6.88					6.75				
Practice	5.98					6.97				
Using Media		4.96	.000	24.60	0.04		-1.07	.294	-2.14	-0.07
Belief	6.68					7.03				
Practice	6.23					7.44				
Imparting Information		-6.89	.000	-13.78	-0.02		-4.18	.000	-8.36	-0.37
Belief	6.02					4.41				
Practice	6.75					6.22				
Knowledge of Subject		10.04	.000	100.80	0.16		1.61	.118	2.59	0.07
Belief	7.84					7.81				
Practice	6.99					7.31				

Beliefs LF

Expert teachers mean scores are higher in four of the five Learning Facilitation subsets than non-expert teachers, the only exception to this is in the subset 'Interactive Teaching' where non-expert teachers have a slightly higher mean of 9.06 (compared to 9.0). This implies that expert teachers believe more strongly in LF approaches.

Beliefs KT

Interestingly expert teachers have a lower mean score in three of the four Beliefs 'KT' subsets. The only exception to this is the 'Using media' subset where expert teachers have a mean score of 7.03, higher than non-expert teachers mean of 6.68**.** This suggests that expert teachers have less strongly held KT beliefs than non-expert teachers. It also suggests that expert teachers have a more positive view of the use of technology in teaching than non-expert teachers.

Practices LF

Expert teachers have a higher mean score in all LF practices than non-expert teachers. This implies that expert teachers are also more able to practice their LF beliefs in online environments, although it should be noted not to the extent that their beliefs imply.

Practices KT

Expert teachers also have a higher mean score in all KT practices than non-expert teachers apart from the 'imparting information' subset. This illustrates that even though expert teachers hold weaker KT beliefs than non-expert teachers about the importance of KT practices, they still exploit online learning environments for these purposes.

The highest mean score for both expert and non-expert teacher groups is in Facilitative Teaching (Experts, 8.63; Non-experts, 7.52) and Motivating students (Experts, 8.0; Non-experts, 7.16). These are followed by Knowledge of Subject (Experts,7.31; Non-experts,6.99); Using media (Experts ,7.44; Non-experts,6.23); Problem Solving (Experts ,8.63; Non-experts,7.52); Training for jobs (Experts, 6.97; Non-experts,5.98); Imparting Information (Experts,6.22; Non-experts,6.75). Interestingly both samples also had some of their lowest mean scores in the same subsets, i.e. Interactive teaching (Experts, 6.75; Non-experts, 5.05) and Pastoral interest (Experts,6.0; Non-experts, 5.19). This suggests that all university teachers are most likely to practice Facilitative Teaching and Motivating students and least likely to practice Pastoral interest and Interactive teaching than any other activity (barring imparting information in the case of expert teachers).

As was be seen in Table 33 the rank order of expert and non-expert teachers' beliefs is very similar, with all LF Beliefs scoring more highly than all KT Beliefs and illustrating a very close match between all teachers' rank order of these items. With online practices, the LF practices have a similar rank order between expert and non-expert teachers, areas of note are the big gap for both sets of teachers between beliefs and practices with 'Interactive Teaching' and 'Pastoral Interest' as already discussed.

The more notable differences arise in the KT practices of non-expert teachers. Both sets of teachers are concerned with their own knowledge, ranking 'Knowledge of Subject' highly (3rd non-expert teachers; 4th expert teachers). The biggest difference between the two sets of teachers can be seen in the items 'Imparting Information'. For non-expert teachers 'Imparting information' is ranked highly (4th) in their actual practices, i.e. they are using online learning environments to transfer information to students. Expert teachers however ranked this item 8th, **a 4 point difference in ranking**. Expert teachers are therefore much less likely to use an online environment as a means of transferring information.

If the delineation of expert teachers against their perception of teaching as 'Imparting Information' is once again drawn on, it can be seen that the two distinct groups of expert teachers have very different responses. Using this delineation it can be seen that expert teachers who score the 'Imparting information' belief item low have a much closer alignment of beliefs and practices apart from 'Pastoral Interest' and 'Knowledge of Subject', in both cases they have higher belief scores than practice scores. Interestingly this subgroup of expert teachers appear to practice what they preach when teaching in online environments. Continuing with this delineation it can be seen that expert teachers who score the 'Imparting information' belief item high have big differences in their scores and less alignment between their beliefs and practices.

Table 37: Rank order to compare Expert (high and low Imparting Information mean belief scores) and non-expert teachers' scores

	Non- expert Teachers		Expert Teachers high mean score for Imparting Information subset		Expert Teachers low mean score for Imparting Information subset	
	Beliefs	**Practices**	**Beliefs**	**Practices**	**Beliefs**	**Practices**
Interactive Teaching	**1**	**9**	**3**	**9**	**3**	**3**
Mean scores	9.06 Strongly Agree	5.05 Undecided	8.7 Agree	5.5 Undecided	9.1 Strongly Agree	7.2 Agree
Motivating students	**2**	**2**	**1**	**1**	**2**	**2**
Mean scores	8.92 Strongly Agree	7.16 Agree	9.3 Strongly Agree	7.8 Agree	9.1 Strongly Agree	8.0 Agree
Facilitative Teaching	**3**	**1**	**5**	**2**	**1**	**1**
Mean scores	8.91 Strongly Agree	7.52 Agree	8.5 Agree	7.8 Agree	9.3 Strongly Agree	9.0 Strongly Agree
Problem Solving	**4**	**6**	**2**	**8**	**5**	**5**
Mean scores	8.78 Strongly Agree	6.16 Undecided	9.1 Strongly Agree	6.4 Undecided	8.7 Agree	7.1 Agree
Pastoral Interest	**5**	**8**	**4**	**6**	**4**	**9**
Mean scores	8.21 Strongly Agree	5.19 Undecided	8.8 Agree	5.5 Undecided	8.8 Agree	6.2 Undecided
Knowledge of Subject	**6**	**3**	**6**	**3**	**6**	**4**
Mean scores	7.84 Agree	6.99 Undecided	7.9 Agree	7.4 Agree	7.8 Agree	7.2 Agree
Training for Jobs	**7**	**7**	**7**	**5**	**8**	**7**
Mean scores	6.88 Undecided	5.98 Undecided	7.1 Agree	6.8 Undecided	6.6 Undecided	7.0 Agree
Using media	**8**	**5**	**8**	**4**	**7**	**6**
Mean scores	6.68 Undecided	6.23 Undecided	7.0 Agree	7.3 Agree	7.0 Agree	7.5 Agree
Imparting Information	**9**	**4**	**9**	**7**	**9**	**8**
Mean scores	6.02 Undecided	6.75 Undecided	6.9 Agree	6.3 Undecided	3.6 Disagree	6.2 Undecided

5.17 Conclusion

H_1
Expert teachers' pedagogical beliefs and online teaching practices will be more closely aligned than non-expert teachers' pedagogical beliefs and online teaching practices.

This study has largely supported H_1**.** The Pearson product moment correlations show that the non-expert sample had only a small number of correlations, compared to the expert teacher sample which had many correlated items. In particular the non-expert teachers had few correlations and only three subset pairs correlated, namely: 'training for jobs' (*r*=.354, p<.001); 'using media' (*r*=.327, p<.001); and 'knowledge of subject' (*r*=.323, p<.001), **i.e. all KT items**. These correlations show that only non-expert teachers' KT beliefs are carried out in the online environment.

On the other hand expert teachers had a large number of correlations with four correlated pairs of subsets, namely: 'facilitative teaching' (r=.458, p=.008); 'pastoral interest'(r=.730, p<.001); 'motivating students' (r=.598, p<.001), **i.e. three LF items** and 'training for jobs' (r=.460, p=.008). The correlations show that expert teachers are more likely to 'practice what they preach', in that they believe in LF and can practice some elements of this in their online environments.

In the factor analysis for non-expert teachers a clear distinction can be seen in beliefs which cluster precisely along the LF/KT distinctions suggested by Gow and

Kember (1993). Non-expert teachers' practices, however, are more complex with a 'mixed' approach suggesting an un-theorised approach to teaching online, this is similar to findings in other research (e.g. Ertmer, 2005). The name given to this factor is informed by the lack of correlation between subsets in the Pearson's *r* analysis, the significant differences between the paired subsets in the paired t-tests and the factor analysis. The second factor is more clearly connected with KT as it loads on three of the four KT items, interestingly however, 'motivating students' also loads on this factor suggesting that non-expert university teachers are attempting to use online environments to motivate and stimulate interest in the subject in their students. However 'motivating students' was not correlated with any LF items in Pearson's *r*; this suggests that this is not a principled association.

The factor analysis for expert teachers showed, in factor 1, that beliefs were not drawn along a division between LF and KT. The 'Using media' subset is associated with LF approaches here and other LF subsets in the correlations and so it is argued that this is being used as an LF approach. As the use of technology is important for this group (as seen in the correlations, and paired sample t-tests) and as this factor was more associated with LF items it was named 'Techno-Facilitation'. The second factor was very clearly associated with KT, and negatively associated with facilitative teaching, whilst again the use of technology is important for this group (as seen in the correlations, and paired sample t tests), so this factor was named 'Techno-Transfer'.

The 'techno-facilitation' approach followed through to expert teachers' practices, with high loadings on all LF items highlighted. In factor 2 a KT approach was found similar to that found by Kember and Kwan (2000) where these items were also associated with a caring concern for students.

In addition to the factor analysis the evidence to support H_1 can be seen in the correlations four of the five LF items were positively correlated, three of them significantly so. The 'using media' subset is associated with LF items in the factor analysis and significantly associated with two LF items in the correlations (pastoral interest r=.449, p=.010; and motivating students r=.614, p<.001) and two KT items (training for jobs r=.477, p=.006; and knowledge of subject r=.509, p=.003). This suggests that expert teachers have mainly LF approaches but also believe in preparing their students for work and other post-university roles.

The distinction between LF and KT approaches is clear in non-expert teachers' beliefs. Not so with expert teachers however, whose beliefs are not clearly defined in this way. Two KT items stand out 'Training for jobs' and 'Knowledge of subject'. 'Training for jobs' is only correlated with its subset pair, however 'Knowledge of subject' is correlated with 'facilitative teaching' (r=.540, p=.001), suggesting that expert teachers value their own knowledge to facilitate student learning and

prepare students for work, as in a community of practice where novices work with master craftsmen in an apprenticeship model.

Factor analysis reveals that expert and non-expert teachers have very different online teaching practices. In factor 1, non-expert teachers appear to associate most practices in their online teaching with no principled approaches highlighted. In factor 2 the KT beliefs articulated earlier are given expression in some online practice but these approaches are associated with motivating their students. Conversely, expert teachers appear to have more consistent LF practices, as expressed in their beliefs. They too express KT practices but with the addition of pastoral interests and so, even where teacher-centred practices appear to occur the expert teachers express a high concern for their students.

H_2
A 'gap' will be found between non-expert teachers' pedagogical beliefs and online teaching practices and this gap will be larger than the gap between expert teachers' pedagogical beliefs and online teaching practices.

The findings from this research would also largely support H_2. A gap has been identified between beliefs and practices mean scores and this gap is found to be larger amongst non-expert teachers' pedagogical beliefs and online teaching practices than expert teachers'. This appears to be particularly so for those with a low mean score for 'Imparting Information' beliefs. Evidence for this can be found in the paired t-tests where the differences between the scores for KT beliefs and online practices (other than in 'imparting information') were not significantly

different. This shows that even though expert teachers had less strong KT beliefs than LF beliefs, they are able to practice their KT beliefs within online environments. Conversely for non-expert teachers all beliefs and practices were found to be significantly different.

The MANOVAs identified which of the independent variables accounted for patterns of approaches within the non-expert sample. It was found that female teachers, those with more than six years teaching experience, those with teaching qualifications, those who were members of the HEA and those who had taken part in some form of online training/ development were significantly more likely to practice learning facilitation behaviours online. Due to the small size of the expert sample and a lack of power it was not possible to identify any variables which may account for the differences seen. However a visual sort of information against the 'Imparting Information' beliefs items found that teachers who have a high mean score in this subset are more likely to teach science subjects and these teachers could be seen to have less aligned beliefs and practices than other expert teachers.

Chapter 6

Discussion

6.1 Introduction

This thesis is concerned with the similarities and differences between the pedagogical beliefs and online teaching practices of university teachers. It has been found, as hypothesised, that expert teachers' beliefs and practices are more closely aligned than non-expert teachers' beliefs and practices; and that a gap exists between non-expert teachers' pedagogical beliefs and online practices which is larger than the gap which exists between expert teachers' pedagogical beliefs and online teaching practices. The aim of this chapter is to discuss the implications of these findings in terms of their impact on student learning and the consequences for university teacher development.

The underlying concepts of this study stem from Gow and Kember's (1993) research which suggested that university teachers broadly take one of two approaches to their teaching, i.e. either a Learning Facilitation (LF) approach or a Knowledge Transmission (KT) approach; and Trigwell and Prosser's (1996) distinctions between student-centred/ teacher-centred approaches. They identified, as have subsequent researchers (Norton et al, 2005; Richardson et al, 2007), the influence of context in teachers' approaches to teaching. However, what these earlier studies have not

addressed has been the context of online teaching. The purpose of this research was to specifically consider this growing teaching context and examine what practice occurs there and how this was aligned with, or might differ from, the teachers' beliefs.

This research has found that non-expert teachers are using online learning environments not to facilitate learning, as defined by Gow and Kember (1993), or to support student-centred learning, as defined by Trigwell and Prosser (1996). The factor analysis reveals that these university teachers' beliefs can be clearly categorised as LF or KT approaches, but their practices when teaching via online environments are significantly different. Factor analysis, Pearson product-moment correlations and the paired sample t-tests demonstrate that non-expert university teachers' beliefs show a greater orientation towards learning facilitation than knowledge transmission. However, when these same teachers teach online they adopt a variety of practices that bear little resemblance to their beliefs.

The analysis of the expert teachers in this research shows that they have more closely aligned pedagogical beliefs and online teaching practices. In this group beliefs and practices were more closely correlated and the gap identified between beliefs and practices was smaller than the gap identified in the non-expert teachers' group. However this did not appear to be a homogenous group. A bi-modal

histogram was found during the descriptive statistics analysis which Dancey and Reidy (2007) suggests indicates two distinct populations within the group. This appears to be valid when the expert teacher group is delineated against the 'imparting information' belief item. Using this subset to separate the group, allows the emergence of a sub-group with more closely aligned LF beliefs and practices, and the emergence of a second smaller sub-group with more of a KT approach and with less aligned beliefs and practices.

Both hypotheses, therefore, appear to be supported by this study. This chapter will now discuss the implications of these findings for student learning, staff development and future research in the field.

6.2 The implications for student learning.

As illustrated in Chapter 3 the HE sector is dominated by literature that promotes a pedagogical belief in constructivism (See, for example, Biggs and Tang, 2007; Ramsden, 1992; Light et al, 2009; Cowan, 2006; Race, 2006; and Fry et al, 2008). The overriding message regarding student learning is clear, active involvement in the learning process is key to quality learning experiences. As previously discussed, however, constructivist teaching practices have not been found to be the prevailing practice within the sector (see for example Murray and Macdonald, 1997; Samuelowitz and Bain, 2001; Kinchin et al, 2009; and Gulati, 2004).

As described, the emphasis on constructivism has been seen to heavily influence the literature in online learning (Salmon, 2003, 2004; Laurillard 1993, 2009; Conole et al, 2007; Beetham and Sharpe, 2007; and Weller, 2007). Once again the emphasis is on active involvement of the student in order to ensure a quality learning experience, but, once again, practice has been found to differ from espoused theory with Ertmer (2005) and Windschitl (2002) finding little actual constructivist practice.

The literature on teachers' approaches to teaching first identified the gap between university teachers' pedagogical beliefs and practices. The gap between beliefs and practices is important because a link has been identified between teachers' approaches to teaching and students' approaches to learning (Prosser & Trigwell, 1999; and Leung et al, 2008) and similar findings have continued to emerge (Parpala et al 2010; Kaur and Sidhu, 2010). The present study, in line with other research, shows that university teachers' beliefs are generally more orientated towards learning facilitation but their online teaching practices are not. It was found that, although non-expert university teachers espoused a belief in the prime importance of 'interactive teaching' (mean 9.06) it was the thing which they were least likely to do in their online teaching (mean 5.05); further it was found that despite a belief in the importance of problem solving and enabling students to become lifelong

learners (mean 8.81) they were also unlikely to provide online activities which stimulated this pursuit (mean 6.97).

The LF items which non-expert university teachers seemed most likely to use in online learning environments were 'facilitative teaching' (mean 7.52) and 'motivating students' (mean 7.16). These results are hard to decipher as whilst this result suggests an attempt to encourage autonomy it is unclear how this is actually done, particularly as few problem solving activities appear to have been provided (mean 6.61) or virtual spaces in which to interact (mean 5.05).

The implications of these findings are that because of the teachers' approaches to online teaching, students are less likely to take a deep approach to their studies in such virtual environments. It may be the case, as Beetham and Sharpe (2007) indicate that many OLEs are used for largely administrative purposes, but this would appear to be unlikely as Table 8 illustrates heavy use of OLEs with 34.6% of respondents using their OLE on a daily basis and a further 44.6% using them weekly. Nevertheless there would appear to be little for students to 'do' in many OLEs and the KT approaches identified in the quantitative analysis suggest a belief that knowledge can merely be transmitted and the student is no more than a passive recipient of information. This is not the future imagined by the early online teaching enthusiasts and if this study's findings were to be generalised across the

HE sector then it could be argued that online learning environments are being used in ways unlikely to develop higher order skills (Bloom, 1956) or develop lifelong learning skills and abilities proclaimed as the aim of the sector (HEFCE, 2007)

Clearly the focus on one teaching environment cannot be taken out of context. It may well be the case that university teachers are developing higher order skills, problem solving and interactively teaching in other teaching environments. However as similar 'disjunctions' have been found between beliefs and practices in other research in more general teaching environments (Murray and Macdonald, 1997; Samuelowicz and Bain, 2001; Norton et al, 2005; and Richardson et al 2007) it is argued that this is unlikely to be the case. Online learning environments appear to be heavily used (Table 8) and will, no doubt, be included in the rhetoric of programme delivery but this use appears to be largely KT in nature. The increasing use of OLEs to partially deliver academic programmes is therefore likely to exacerbate an already complex situation and, if the use of OLEs was to grow (as a result, for example, of cutbacks in HE funding), then this would clearly further aggravate the position.

It is argued that the reasons for the disjunction between beliefs and practices in the present study can be found at many levels, as identified by Fanghanel (2007). Firstly the macro level where government and business expectations have heavily

influenced the nature of higher education and with its focus on economic outcomes; secondly the meso level which includes the HE institutions themselves, their students and the disciplines; and finally the micro level considers the university teacher, their identity and beliefs. Each of these levels will now be considered in conjunction with the findings of this study.

The perception of education as a commodity has been encouraged by the UK government and persuaded students to attend higher education for personal economic advantage, a form of 'instrumental reason' that pervades society in general (Habermas, 1978). When learning is viewed in this way it objectifies knowledge, and the learning process is devalued as a result; the product, certification, becomes an end in itself. Such an attitude promotes the notion that knowledge can be imparted from one to another, and is not uniquely constructed by each person as claimed by constructivists. The prevailing managerial discourse within universities has further promoted the notion of commodification, as class sizes have increased, without a resultant increase in teaching resources. In this scenario the use of technology is seen as a means of increasing teaching efficiency; the model assumes that knowledge can be transferred and that an online environment is the most efficient place in which that transfer can occur. The use of online learning environments was partially introduced into HE as a means of efficiency saving (Dearing, 1997), but for many who teach in universities the more

important question has been about how the OLEs can be exploited to improve the quality of student learning.

It has been found, however, that despite a large body of literature encouraging the development of constructivist online pedagogies research has shown that teachers tend to replicate their existing, largely traditional, pedagogies in online environments and these teaching methods dominate existing practice, which has been further corroborated by the present study. On reviewing participants' commentary in the present study it would seem that university teachers' are frustrated by this situation and cite frustration with technology, insufficient time and conflicting priorities as the main reasons for their response to online teaching. Objectivist/didactic teaching methods may appear to be the only alternative to a time-starved university teacher with large classes.

The function of university to train students for work now appears to be an accepted part of the university teachers' role. Evidence for this can be seen in this study as in all teachers' practices 'Training for Jobs' was associated with both LF and KT approaches to teaching and in the Pearson-product moment correlations this subset was aligned for expert teachers and also one of the few aligned subsets for non-expert teachers. Fanghanel (2007) argues that 'academics [… have] absorbed as inevitable the employability agenda'. This is hardly surprising when one

considers the pressures put on universities to principally prepare students for work and as Jarvis (2010:45) points out 'formal lifelong education is now regarded as something necessary for work rather than for the humanity of the learner' and must have clearly impacted on participants' responses to the 'training for jobs' beliefs and practices items, which, in Gow and Kember's original research (1993) was defined as a KT approach.

The pedagogical literature in this area (e.g. Salmon, 2003, 2004; Laurillard, 1993, 2009; Beetham and Sharpe, 2007; Littlejohn and Pegler, 2007; Herrington et al 2010) has exhorted constructivist theory as the means with which to assure quality student learning experiences, but this study's findings suggest that very little of this is actually happening in practice. Some of the commentary provided in the open boxes within the non-expert sample illustrates the frustration experienced by many university teachers with technology. These teachers' perceptions of online learning environments show that they are unconvinced by the use of online environments and the commentary provided below illustrates that they consider OLEs to be pedagogically inappropriate environments in which to study their subjects.

> 'in general, I do not think much of the 'electronic hype'. Instead of engaging critically with a subject area (which does involve reading, discussing, etc.), we foster the modernist belief that more technology will solve the problems. However, we do create students who are unable/willing to engage in serious debate, powerpoint their thinking and lack the ability and often the language/writing skills to engage in topics in ways that go beyond simplistic jargon.'
>
> Male, 58, Geography teacher

> ‘There may be a confusion in these questions between teaching as transferring [sic] information and teaching as education, as inspiring understanding and aspiration. “Law” is not primarily a subject to be learned: it is an activity to be understood and practised. There is also a gulf between what many universities think they want from “teaching” and what the students need in particular disciplines, such as Law. On-line resources are useful for transmitting information, but seldom useful for promoting understanding and disciplined and critical thinking.’
>
> Male, 56, Law teacher

The literature that encourages a refocus in HE on the needs of a ‘supercomplex’ world (Barnett 2002), extols the use of problem solving activities and discussion to promote critical thinking. The present study has found that online learning environments are currently not being used for problem solving activities or to generate discussion by non-expert teachers and some expert teachers, i.e. those with ‘imparting information’ beliefs. Amongst other expert teachers however there is a closer alignment of beliefs and practices with activity and discussion highlighted in online practice. Problem solving beliefs were strongly agreed with by all teachers (mean score non-expert 8.81, and expert 8.78 respectively) but when it came to the use of problem solving practices in online environments both groups of teachers were ‘undecided’ about their use (Table 36). Again however when delineating expert teachers on the ‘imparting information’ beliefs it was found that problem solving practices were being enacted by some expert teachers.

Other possible contextual reasons for the results found in this study are found at the level of the university itself. This study found that 42.5% of the non-expert teachers have no teaching qualification and as such may have no expert understanding of how students' learn. In the multivariate analysis of variance possession of a teaching qualification was found to be a statistically significant factor in determining whether a teacher had LF beliefs and practiced these. These findings therefore suggest that possession of a teaching qualification is important for enhancing the quality of student learning. Interestingly 81.1% of non-expert respondents claimed to have received some form of general learning and teaching development, but this was found, in the multivariate analysis of variance, to make no statistically significant difference to whether a teacher took an LF approach to their teaching. This finding implies that a more rigorous and demanding programme of study is required to influence teachers' conceptions of teaching. Just over half of the 529 respondents (53%) had received some development in the use of online learning and this was also found to be a significant factor identified in the MANOVAs that led to an increase in LF and KT beliefs and practices. It would seem therefore that this specific form of training has had a positive impact in developing online teaching practice.

University teachers appear to have diminishing control of their teaching and learning methods. This study identified that some university teachers' felt coerced into using online learning environments and that limited contact time and

competing objectives have relegated the importance (or maintained the lower status) of all learning and teaching activities. Increasing student numbers and evaluation methods such as the NSS have led to growing managerialist demands that teachers satisfy teaching demands in addition to the 'real' job of producing research publications. This situation is further exacerbated by demands from students themselves who, as paying 'customers' are desirous of a high quality product, which will assure their future affluence. These multiple demands have further fuelled the promotion of online learning environments within HE teaching as the online environment is intended to take up some of the shortfall in teaching not provided elsewhere.

> 'I provide as many resources as I can for my students because I simply don't have enough time with them to discuss the content of my modules. By putting everything in blackboard I feel less guilty and I can at least encourage them to get on with their studies if they chose to make the time.'
>
> Female, 46, Business studies teacher

One of the interesting findings in the present study is that non-expert teachers in Post '92 universities are significantly more likely to hold LF beliefs. This finding suggests these teachers are more aware of teaching strategies to promote student-centred learning. This finding is not unexpected however as the Post '92 universities tend to have students with lower entry qualifications and at the same time there is less emphasis on research outputs. The nature of the university has therefore affected the teachers' pedagogical construct as Fanghanel (2007)

suggested. Notably, however, this belief is not carried over into the teachers' practices.

A further meso level factor that appears to have impacted upon the findings of the present study is that of discipline. This is identified in the literature as a significant influence in university teaching, although in the non-expert teacher sample discipline was not found to make any significant difference to university teachers' pedagogical beliefs or practices. However, in the expert teacher sample it was found that those most likely to express a belief in teaching as 'imparting information' were more likely to be science teachers. These teachers had more plural beliefs (Kinchin et al, 2009) than other expert teachers rating all LF and KT beliefs highly. These teachers' practices were however then less aligned with their beliefs.

Further contextual reasons identified for the findings of this study can be found at the micro level of the teachers' identity and pedagogical beliefs. A consideration here is the manner in which university teachers' performance is measured. Baxter et al (1998) argue that trust has been lost between academics and managers and that academics now spend more time on administration rather than more fundamental aspects of their role, and Macfarlane (2006) suggests that academic labour has become 'invisible'. The primary role for many university teachers is that

of researcher and many respondents illustrated the need to meet research targets is a dominant demand which takes priority over the time they have to spent on teaching. This appears to be the case for all teachers whether teaching in a Pre' or Post '92 university. This is an unexpected finding as the Post '92 universities have traditionally had a greater focus on teaching than research outputs but this focus may be shifting.

> 'The real problem is that these developments are not seen as part of the promotion ladder - without a measure of quality and usage it is hard to see how it is going to develop beyond the low level stuff currently posted which is not vle but simply a postbox.'
>
> Male, 32, Education Studies, Post 92 institution

> 'There is increasingly a disincentive to pursue new learning and teaching teachnologies [sic] in our University as the priorities we are given have changed for us to be more research productive within our subjects. This means we increasingly do not have the time to innovate or keep up with good practice in learning and teaching. Very sad.'
>
> Female, 42, Health Studies, Post 92 institution

> 'The balance between T&L, academic research and the key success factors for promotion are not clear. Publishing in academic journals still seems to be the driver of career success'.
>
> Female, 39, Psychology teacher, Pre 92 institution

The university teachers surveyed here then are pulled in two apparently competing directions of teaching versus research with teaching frequently perceived as the poor relation. Starkey and Tempest (2008) questioned whether emphasising the need to produce research outputs was the best use of all university academics' time particularly as this may detract from time spent in teaching and supporting student

learning. Other commentators believe the distinction between research and teaching is artificial and that they should be viewed more holistically, for example, Brown (2008) argues that research and teaching are flip sides of the same coin and here teaching can be conceptualised as inducting individuals into the discipline through a process of actively involving students as researchers.

The main focus of this study has been at the micro level and the final area of discussion is the impact of pedagogical beliefs on online teaching practices. Much of the literature on beliefs and practices assumes that beliefs influence practice. Kuhn (1970) and Nespor (1987), (cited in Gunstone, 1994) warn however that this is a slow process. The argument was made earlier however (Chapter 3), that this is more likely to be a two-way process, i.e. that beliefs influence practices but that equally practices can also influence beliefs. Evidence can be seen for this in the present study in the MANOVAS on the non-expert teacher sample, where it was found that there was a significant difference in teachers who had taken part in some form of online development, in that they were more likely to take a LF and a KT approach in their teaching than those who had not taken part in online training. Guskey (2002) suggests that teachers' beliefs change through experiential learning processes and that through reflection on these developmental activities they change their holistic view of learning and teaching. Levin and Wadmany (2006:174) agree believing that 'real change occurs in classroom practices, even before the teacher can consciously conceptualise newly established educational beliefs'. This

also supports Becker and Ravitz's (1999) "Trojan Horse" theory, which implies that the introduction of ICT has encouraged changes in practice that have been useful catalysts in encouraging reflection on pedagogical practice in all learning environments. This reflective process suggests, according to Argyris and Schon's theory of action (1978), that humans will learn from their actions and use what they learn to plan and implement future actions, which ultimately affects their beliefs (Kane et al 2002). Levin and Wadmany (2006:173) go further suggesting that teachers are able to change their views of students and the students' role in the learning process because of using technology which they believed allowed teachers to cope with the teaching demands placed upon them,

> 'A multifarious viewpoint with simultaneous, seemingly discrepant views, means that teachers can adapt their own instruction to different students' or classroom needs, or to teach different subject areas assuming that more than one didactical approach is instructionally appropriate. It also allows teachers to survive in a pluralistic educational world in which teachers are exposed to divergent views on the definition of learning and what constitutes effective teaching in a technology-driven world.' Levin and Wadmany (2006:175)

They suggest that teachers may not be aware of their 'emergent' beliefs and may even nurture multiple conceptions 'caused by feelings of insecurity at the prospect of relinquishing long-held beliefs' (Levin and Wadmany, 2006:175)

It is argued that the results found in this study support Becker and Ravitz (2001) and Levin and Wadmany's (2006) findings that teachers' practices are located on a continuum, with 'teaching as transmission' at one end and 'teaching as learning

facilitation' at the other. This is particularly highlighted in Table 33 which shows the rank order of teachers' beliefs and practices. Levin and Wadmany (2006:173) found that teachers 'demonstrated multiple views rather than pure beliefs […..and could] even hold two seemingly conflicting orientations at the same time.' This can certainly be seen amongst teachers in the present study whose practices frequently appeared 'mixed'. Table 34 illustrates however that some expert teachers are more able to align their beliefs with their online teaching practices.

Other micro level constraints on beliefs and practices may be more prosaic. For example, Lim & Chai (2008), discussing school practice, suggest 'these constraints may include the lack of access to computers, insufficient time to plan instruction and for teachers to familiarise themselves with computers, inadequate technical and administrative support, and pressure from parents and schools to ensure students do well in end-of-course examinations'. In the open-box commentary respondents in the present study raised some of these issues in the HE context and these fundamental issues regarding the availability of technology itself, in addition to time and support in learning how to use this technology, cannot be overlooked.

The 'knowledge of subject' subset highlighted some interesting findings in this study. In the original research by Gow and Kember (1993) knowledge of subject was classified as a KT item and Trigwell and Prosser's (1996) also conceived of this

as a 'teacher-centred' attribute, implying that the teacher cared more about their subject than the student's learning. For the teachers who participated in the present study it can be seen that both sets of teachers agreed that a personal knowledge of subject was important for their teaching and was ranked highly (non-experts 3rd; experts 4th) in their online practices. These teachers may be using online environments to support more core or foundational knowledge purposes rather than higher-level cognitive exercises as recommended elsewhere. Ertmer (2005) also suggested this may be the case,

> 'although teachers may express the belief that technology is best used for high-level problem-solving activities, their day-to-day uses may include a number of drill-and-practice applications, because they hold a more central belief that teachers are responsible for assuring that their students learn foundational, or prerequisite, skills.' (Ertmer, 2005:29)

Conversely it could be the case that university teachers perceive their own knowledge to be an integral part of effective teaching. The language of constructivism may lead some to believe that this theory devalues knowledge which for many is counter-intuitive and unprofessional. This subset, and its original classification as a KT/ teacher-centred item, is illustrative of the frustrations felt by some (e.g. Young, 2008) with constructivism.

6.3 Implications for staff development

Fanghanel (2007) recommends that university teachers are offered a degree of agency in order to promote their teaching development. She postulates that without agency teachers will resist new developments and such resistance (in this case to the use of online technology) can be seen in the present study. This can be seen quantitatively in the lack of a principled approach to teaching online in non-expert teachers and qualitatively in the large number of remarks concerning the use of online environments left by many of the respondents.

> 'If you teach in a university these days you have no choice but to use a VLE, whether you think it is useful for students or not. You are obliged to put your course materials in this environment and even in a particular format. There are obvious advantages for distance learning students and for contacting people quickly, but on the whole for students who are on campus, it makes them reliant on the lecturer in terms of reading and searching for literature, so it retards rather than enables their development as autonomous learners.'
>
> Female, 43, Environmental Science

Other comments expressed agency as a wilful resistance to the extensive use of online environments,

> 'I have enough to do without learning about the systems each year. I am happy for students to email me or come to see me personally about module issues'
>
> Female, 63, Education

> 'The setup time is too great - to learn how to use the new technology. Secondly, our technology requires annual extensive maintenance to ensure that upgrades do not affect the site. Thirdly, I manage using paper & Face-to-face teaching.'

Female, 38, Psychology teacher

> '[…..] I very very much prefer to see students face-to-face and individually or in very small groups. I feel strongly that on line learning environments detract form [sic] students attending sessions in my dept, and most of all they make it easier for students to 'hide', when they have academic or personal problems. Without wishing to sound overconfident, I do think that after 25 years in the job I can tell a lot more about and get a lot more out of a student if [sic] a couple of minutes face-to-face than in any number of emails/distance learning contexts.'

Male, 53, Theology teacher

These tutors offer differing reasons as to why they are resisting extensive use of online learning environments, from insufficient time, or insufficient training/experience, to expressing a preference for different teaching methods. In deciding on a future strategy to enhance practice in this area it is important to reflect upon how this resistance can be overcome. As current strategies appear to have been insufficient to secure effective use of online learning environments then considering how university teachers can be involved in achieving this objective in the future would seem judicious. Rather than use a top-down strategy of coercion or cajoling, finding the means to persuade through argument and example may be a more effective approach.

It would seem to be the case that expert teachers have been able to express their agency, in that they appear to enjoy using technology. They are clearly positive about the appropriate use of technology in teaching, as seen in their comments, and the high rank order of 'use of media' (3rd) in their practices. They personally are

more in agreement with the use of technology in teaching and they have clearly been able to identify appropriate pedagogical use of these environments. Identifying the range of factors that led expert teachers' to adopt and successfully use technology has been identified as an area of further research emanating from the present study.

Fanghanel's (2007) model of assessing the macro, meso and micro levels of influence on university teachers' approaches to teaching could be further developed at the micro level. The influences exerted upon university teachers can be extended beyond their work identity and pedagogical beliefs to their broader identities outside of the university. This is illustrated in the following comment by one of the non-expert university teachers that expresses exhaustion at the demands put upon them and the difficulties of balancing all these demands with other parts of their lives,

> 'Daily teaching and course leadership commitments plus my wholehearted desire to be a proper mother to my three children mean that I feel I am doing little more than treading water in terms of the use of new technology. I dream of a one semester sabbbatical [sic] to rediscover the teacher I once was.'
>
> Female, 38, Sociology teacher

Staff development units in universities cannot be assumed to hold a neutral position within university systems and may be perceived as part of the power structures within the university with an agenda to manipulate colleagues to 'acceptable'

modes of thinking and practice. This was a view expressed on more than one occasion by respondents,

> 'Let's get rid of VLEs and get back to meeting people in the real world not the virtual world. These so-called learning environments are to keep computer techies in a job. In other words they are self-serving and not really concerned about the students who by and large prefer old fashioned teaching methods regardless of what the latest educational fad.'
>
> Male, 45, Languages teacher

The suggestion that universities have a right to change teachers' beliefs and practices may appear to be an acceptance of instrumental reason and Habermas' (1970) fear of technocratic determinism would appear to have been fulfilled. This would be true if the literature emanating from universities and the scholarship of learning and teaching were recommending transfer of 'inherited information' (Habermas 1970:118) but it is not. As discussed the literature is overwhelmingly constructivist in nature, even if actual practices are not. Cousin (2010) suggests nevertheless that there is a danger that staff developers take a deficit model of the teacher as their starting point.

The role of staff development within universities is, therefore, not without criticism. Green (2009) suggests that there are linguistic barriers to understanding much of the learning and teaching research for many academics. These difficulties lie in the differing research paradigms of social science versus science and humanities traditions for example. The use of specialised vocabulary and the epistemological

differences between the two groups makes communication difficult and change less likely. Poole (2010) suggests that academic staff may respect but do not trust staff development units, citing Philip Smith's (1979) research on British accents he suggests that academics need to be involved in their own 'local', discipline based, learning and teaching research in order to understand and develop their teaching practice. It is known that teachers' beliefs are particularly resistant to new practices and the further a new practice strays from a teachers' usual practice (and psychological 'home') the less likely it is to be implemented successfully (Niederhauser and Stoddard, 2001; Zhao et al, 2002 and Ertmer, 2005).

In recent literature on 'threshold concepts' Cousin (2010) expresses her frustration in attempting to explain student-centred learning approaches to university teachers. She notes the indifference and occasional hostility to these constructivist notions and finds that instead of discussing educational theory a re-focus on the curriculum and how to help students learn particularly difficult concepts may be more fruitful. Interestingly one of the 'threshold concepts' could be teaching university teachers about student-centred learning, allowing them to struggle until they understood the concept (Norton, 2010). Kinchin et al (2009) concurs and describes an acceptance of a more 'plural' system which accepts the place of KT approaches and develops LF approaches alongside these.

It is possible to change beliefs however and this appears to happen following an individual's dissatisfaction with the status quo. Kagan (1992:77) stated that successful staff development activities need teachers to 'make their pre-existing personal beliefs explicit; it must challenge the adequacy of those beliefs; and it must give novices extended opportunities to examine, elaborate, and integrate new information into their existing belief systems.' Therefore to develop teachers' beliefs the root of those beliefs needs to be explored and challenged.

Guskey (1986) argued that beliefs can alter following a successful change in practice which is supported by the self-efficacy literature (Bandura, 1997). The process of changing beliefs and practices surrounding online teaching however appears to be a lengthy process. The empirical research carried out in the present study has not found much evidence of constructivist online teaching practices in the non-expert teacher group. Findings did suggest however that LF beliefs and practices were more likely to be found in teachers with more than six years experience, which would support Ertmer's (2005) assertion. However, Norton et al (2005) conversely found that length of service did not appear to alter teachers' behaviours towards more constructivist practices.

Developing academic staff to use online learning environments more effectively could include multiple elements in addition to those already discussed. Wozny et al (2006) suggest that confidence in the outcome is important:

> 'to maximise the implementation of educational innovations, our findings suggest that professional development must attend to the enhancement of teachers' expectations of success.'

The question remains however as to whether online learning environments are now sufficiently reliable and whether stories of initial failures have faded from memory. University teachers may perceive that technology is still tainted by failure and more trouble than it's worth and without a recognition of this any development activities may be viewed with suspicion. The literature elsewhere recommends the use of champions or mentors to work alongside less experienced others in order to develop their teaching practice. Exemplars like the expert teachers in this study may be influential in such a role.

The literature abounds with recommendations on how best to teach online. Levin and Wadmany (2006:166) for example recommend that online teachers take a 'cognitive apprenticeship' approach to teaching online which involves socialising students in new behavioural norms and professional ways of working; a model of construction which makes thinking visibly situated within a social constructivist paradigm in which students work in teams and on projects or problems with close teacher scaffolding. Cognitive apprenticeship involves Vygotskian 'zones of proximal development' i.e. students require aid from their peers and teacher in

order to succeed and typical teacher behaviours are modelling, coaching, articulating, reflecting and exploring. Alesandrini and Larson (2002:118) suggest, however, that until teachers are exposed to constructivist methods of teaching themselves 'they may not be equipped to plan and facilitate constructivist activities'. As little evidence is found of constructivist teaching in the non-expert group of teachers in the present study then the use of online constructivist developmental activities may well be the means to achieving these ends.

The use of expert teachers as mentors is a frequent device to develop less experienced individuals. Elmore et al (1996:241) suggest that 'teachers' practices are unlikely to change without some exposure to what teaching actually looks like when it's being done differently.' Exemplars of 'good practice' may prove useful because observing peers teach successfully online may provide a readily understood disciplinary context and information in addition to being motivational (Schunk et al, 2008). Jarvis (2010) agrees

> '.... copying is at the heart of our social learning and it is no bad thing! [...] Imitation is quite fundamental to our social living and basic to our learning processes' (Jarvis 2010:13)

Windschitl (2002) disagrees however, arguing that this is insufficient on its own to develop the necessary depth of understanding needed for effective online practice. However, it is argued here, that in a time-poor environment it may be more

appropriate to begin this journey of development with examples of good practice and with time and additional supports, this practice may start to impact on beliefs. Such developmental activities could provide a reflective space in which academic staff reflect upon what works in their online teaching and provide one (or more) model(s) which could generate ideas. The cognitive dissonance that any period of change brings about could then be challenged and supported within a nurturing and supportive environment.

Others still may argue for the division of the teaching role between researchers/ teachers and support workers, a process already begun in some institutions (Conole et al 2007). It is argued however that such strategies can diminish teaching in general, with the OLE further used as a delivery mechanism rather than being perceived as an integral part of the course design. Laurillard (2008) argues that this holistic perspective can only come from the academic, i.e. the subject expert. It is the academic who understands the subject at its critical height and is immersed in its epistemology and signature pedagogies and it is this level of understanding which students should be exposed to.

The broader considerations of the external environment cannot be ignored in the process of staff development. The outside world may not share the vision of higher education as an emancipator and a place for critical thought and as Zhao et al

(2002) point out changes to pedagogies will not be adopted if they are at odds with prevailing pedagogies, practices and management demands. Ertmer (2005:35) encourages us to have 'ongoing public conversations' with all stakeholders about what is needed and how best it is to be achieved. She believes that the proposed changes can be achieved through 'communities of practice'; peer observation of practice; the gradual introduction of new technology; and ongoing technological and pedagogical support. Windschitl (2002) concurs believing that for teachers to successfully conduct constructivist teaching, they need to fully appreciate and negotiate not only the epistemological and pedagogical dimensions of the pedagogical shift, but also the cultural and political dimensions.

The use of one final strategy should also be considered and that is of involving university teachers in their own pedagogical research. University teachers are academics and therefore used to research and the pursuit of knowledge via evidence-based projects. The engagement of university teachers in researching their own teaching practice may be a means of further engaging these individuals in this part of their roles, providing opportunities for publication whilst, at the same time, encouraging a focus on student learning and appropriate teaching practice. Borko (2000) and Gosling (2001) believe that teachers need professional communities of practice to discuss the challenges they face. In these circumstances expert teachers could have a role to play in demonstrating their practice and supporting others towards more facilitative online teaching practices.

Bass (1999) also suggests that instead of viewing problems in teaching as issues needing quick solution, we need to develop the scholarship of teaching by investigating those problems over a longer period of time, much as other problems are investigated, i.e. through a considered researched and evidence-based approach. An emphasis on the scholarship of learning and teaching allows participants to research their own practice and may provide the catalyst to development and ongoing reflection on practice so needed within the sector.

6.4 Criticism of methods and recommendations for further study

The work on conceptions of teaching is perceived by some to be psychologised and deficient in that it does not take into account the impact of context on practice (e.g. Fanghanel 2007). The instrument used in this thesis has focused on the alignment of pedagogical beliefs with practices, however, through additional quantitative and qualitative analysis it has been able to identify contextual factors which appear to influence beliefs and practices and so the results do not assume that beliefs are the only factor which affects practice.

Nevertheless, the methods used in this research can be criticised on a number of fronts. Self-report of practices have been criticised elsewhere for example, Palak and Walls (2009:436) state that 'dichotomous distinction of teachers' beliefs is

complicated to gauge with self-report data alone [….] we argue that teachers' beliefs are extremely difficult to strictly categorise as student-centred or teacher-centred with self- report data alone.' Observation of actual online teaching practice would clearly provide richer data, but also be extremely time-consuming to gather. It is felt that the additional data gathered in this study from the open box comments has provided a useful seam of evidence that has provided telling commentary on expert and non-expert university teachers' online teaching experiences which helps in the interpretation of the quantitative analysis.

Further research could also usefully focus on the subsets used to distinguish between teachers' approaches to teaching. This study has illustrated that the KT subsets in particular could be reviewed. Norton et al (2005) and Richardson et al (2007) questioned the place of 'using media' as a KT item and this is further corroborated in the present study. Further 'Training for Jobs' appears to have been imposed upon the sector and as such its classification, as a KT subset, should be reviewed.

Further research in this area could usefully interrogate the nature of 'expert' teachers' online practice. The existence of two sub-groups within the expert teacher group in the present study indicates that there is not necessarily one best way in which to teach online, or to be acclaimed as an expert in this area. A study

which identifies how teachers become to be known as ‘expert’ would clarify our understanding here particularly as Professor Craig Mahoney, head of the HEA (2011) expressed the view that the NTF scheme had been more prone to recognise 'innovation' rather than ‘excellence’ and as such the scheme itself and its processes could be examined.

6.5 Conclusion

This chapter has drawn together the main themes of this thesis. It summarises the discussion by illustrating that the dominance of managerialism within HE has prompted many teachers into a compliant or a passive mode of resistance in using online learning environments. Many teachers want to do a good job, to be up-to-date in their subjects and to inspire their students but the system within and without universities questions their professionalism and this lack of trust has led to extrinsic metrics as the means to control behaviours, such as the NSS. As Schuck et al (2008:540) point out ‘improving teaching quality is mainly about enhanced scores on extrinsic measures – a view of accountability that seems to work against notions of professionalism’. Nevertheless university teachers’ practice does not compare favourably against notions of ‘learning facilitation’ or ‘student-centred’ learning. The overriding suggestion being that university students are not involved in quality learning situations.

This study has shown that only half of all the teachers surveyed have some form of teaching qualification which implies that many university teachers are unaware of educational theory and an understanding of how students learn in any expert sense. This study identified that those with teaching qualifications were more likely to take a learning facilitation approach which the review of literature extols as a means to effective student learning for the twenty-first century. If teaching is a key part of the university teachers' role then a move towards further professionalising the teaching body would be recommended as a result of this study. The recommendation to ensure all new university teaching staff became qualified teachers was first made by Dearing (1997) but it has now also been signalled as an essential element for high quality teaching in the Browne Review (2010)

> It will be a condition of receipt of income from the Student Finance Plan for the costs of learning that institutions require all new academics with teaching responsibilities to undertake a teaching training qualification accredited by the HE Academy, and that the option to gain such a qualification is made available to all staff – including researchers and postgraduate students – with teaching responsibilities. (Browne, 2010:45)

The danger of such an approach, as argued in this chapter, is that it may, ironically, encourage an instrumental or strategic approach to learning in the university teacher. It has been recommended that in order to ameliorate this possibility the university should generate a more dynamic and ongoing culture of valuing teaching, expertise in teaching and pedagogical research. This approach would clearly need to be aligned with recruitment and performance management policies if it were to have maximum impact.

Chapter 7

Conclusion

7.1 Introduction

This study set out to investigate whether university teachers' exercise their pedagogical beliefs when teaching in online environments. Pedagogical beliefs and practices were defined by two approaches, i.e. a 'Learning Facilitation/Student-Centred' approach or a 'Knowledge Transmission/Teacher-Centred' approach (as distinguished by Gow and Kember, 1993 and Trigwell and Prosser 1996). The research on 'Learning Facilitation/Student-Centred' and 'Knowledge Transmission/Teacher-Centred' is important as a link has been established between how teachers' approach their teaching and how students' approach their learning (Prosser and Trigwell, 1999), finding that teachers who take a student-centred approach to teaching are more likely to engender deep (Marton & Säljö, 1976) approaches to learning in their students. Deep approaches to learning are associated with lifelong learning (Kirby, 2010) and the ability to learn beyond formal learning contexts; an ability extolled by governments and other stakeholders of higher education (HEFCE, 2007).

Norton et al (2005) and Richardson et al (2007) devised a questionnaire to assess university teachers' pedagogical beliefs and teaching practices. These research studies focused upon generic teaching contexts and found that although teachers

were likely to espouse beliefs in learning facilitation/student-centred learning they were less likely to practice these; both studies suggested that contextual reasons were responsible for this gap. The implications of their findings were that these teachers' approaches were unlikely to encourage deep approaches to learning in their students.

Due to the increasing use of online learning environments in academic programmes today (Richardson et al, 2007) and the push to use new technologies within higher education (HEFCE 2009) it was considered timely to assess whether a similar gap existed between pedagogical beliefs and online teaching practices. The active promotion of online learning environments in UK higher education persists today. Online learning programmes continue to be seen as a means of competitive advantage for HE and the UK economy and a means to meet student demand for flexibility (HEFCE 2011). The 'problem' of academic staff engagement also continues to be a cause for concern

> To move online learning forward needs sensitive management and coordination of effort. Staff may be willing to engage with technology to meet the expectations of students, or require encouragement and training to so do, but in both cases they need support to be effective. There needs to be a stronger understanding of the potential of web-enabled learning and the use of social media, greater prioritisation of teaching partnerships between technologists, learning support specialists and academics'.
>
> (HEFCE, 2011:7)

Clearly many university teachers are now expected to use online learning environments as a supplement to their existing teaching. Recent financial

constraints however may result in acceleration in the use of such environments and they may begin to become a substitute for, rather than an enhanced feature of, the programme of study. The teaching which occurs within this environment therefore becomes an increasingly important aspect of the student experience and, if Prosser and Trigwell's (1999) finding is correct, will have a growing influence on the learning approach taken by students.

In order to allow comparisons with previous published work Norton et al's (2005) questionnaire was adapted for this purpose and the investigation was mainly conducted using quantitative analysis. In the first instance correlations were examined to find whether pedagogical beliefs and online teaching practices were aligned and factor analysis identified how the component items were clustered. This analysis led to the additional investigation of paired sample t-tests to establish the size of the gap between beliefs and practices. Qualitative data provided useful insight into the academics response to online learning and their working context.

Finally the implications of the research findings were considered. The first was the potential consequences of the online teaching practices identified in this study, if they were to be replicated across the university sector. The second, considered the nature of the staff development needed to enhance online teaching and how this could be achieved within the university teachers' role.

7.2 Non-expert teachers

It has been found that whilst the non-expert teachers in this study express a greater orientation towards learning facilitation in their beliefs, they do not enact these beliefs when they teach online. Few significant correlations between beliefs and practices have been found and, where correlations exist, they are small and associated with knowledge transmission items. The empirical evidence provided in this study therefore supports the hypothesis that a gap exists between university teachers' pedagogical beliefs and online teaching practices as teachers fail to enact their learning facilitation beliefs and instead take a largely unprincipled approach to their online teaching.

The implications of these findings are that online learning environments are not being used to promote student-centred learning/learning facilitation. These constructivist pedagogical approaches are recommended in the literature as the means to promote high quality learning experiences in online environments and this study's findings provide compelling evidence that these recommendations are being largely ignored when non-expert university teachers are designing their online teaching environments. It has been acknowledged that teachers' may be enacting their learning facilitation beliefs in other teaching environments; however

if the use of online environments increases in taught programmes the potentially negative impact of this finding on the quality of the student experience is clear.

In the commentary left by the non-expert teachers it is apparent that many university teachers disliked using online environments in their teaching. Comments focussed on frustration with technology and a lack of time to teach and develop online processes and materials. Many commented on the primacy of disciplinary research demands in their work schedule and their lack of ability to use technology, whilst others expressed their irritation with the underlying pedagogical design of online environments and being forced into using such technologies. These comments and their overwhelmingly negative perspectives illustrate the university teachers' perception of the potential of OLEs and their current context; such issues would need to be addressed if any meaningful teacher development is to occur in the future.

This investigation identifies a number of independent variables that were statistically significant in determining learning facilitation beliefs and practices in this study. The MANOVAS identified that these respondents were statistically significantly more likely to have learning facilitation beliefs and practices and included: female teachers; those with teaching qualifications; those who are members of the HEA (186 HEA fellows of which 152 possessed a teaching

qualification); those with more than six years teaching experience; and those who have received training/development in the use of online environments. For non-expert teachers therefore pursuing pedagogical qualifications and engaging with developmental events is likely to promote the learning facilitation beliefs and practices endorsed by the pedagogical literature. This finding suggests the recommendation that all university teachers should be encouraged to develop their pedagogical knowledge and skills and supports the need for university teachers to gain appropriate teaching qualifications and take part in online teacher development programmes. However, as identified through the qualitative commentary, in order to make this happen due consideration must be given to the university teachers' workloads and explicit priorities.

The literature in the field of professionalising university teachers, however, suggests that merely insisting upon teaching qualifications would be an insufficient response to the long-term and ongoing development of university teachers. Imposing the need to gain teaching qualifications could merely engender an instrumental approach amongst participants where the qualification can be seen as merely something to be 'got out of the way' in order to progress to the 'real' job. This approach may be true in a number of professions, but in advocating a meaningful and ongoing interest in student learning and improvement to practice a complementary approach to qualification could include more integrated

developmental activities such as the use of mentors and the involvement of teachers in researching their own practice via pedagogical research.

7.3 Expert teacher sample

This study also investigated a separate, expert, group of university teachers' pedagogical beliefs and online teaching practices. It was hypothesised that this group of teachers had gained their expert teacher status, in part, because they were able to practice what they preached. The implication here was that a close correlation between beliefs and practices is a necessary condition for effective teaching and if such a correlation was found this would support the argument for developing non-expert university teachers' beliefs about student learning in order to promote effective online teaching practices.

The empirical research found that expert university teachers do have a much greater orientation towards learning facilitation than non-expert teachers in their beliefs. They were not however a homogenous group and again, the two distinct approaches of learning facilitation and knowledge transmission can be identified in their beliefs and practices. Nevertheless, expert university teachers' pedagogical beliefs and online teaching practices are statistically significantly aligned. This can be seen in the correlation of four of the five learning facilitation items i.e. 'interactive teaching', 'facilitative teaching', 'pastoral interest' and 'motivating

students'; and two of the four knowledge transmission items 'training for jobs' and 'knowledge of subject'. The paired sample t-tests illustrate, however, that beliefs and practices are not perfectly aligned and some significant differences continue to be found between LF beliefs and LF practices. It would seem therefore that even expert teachers are unable or unwilling to fully enact their LF practices in online learning environments.

Some of the expert teacher group were found to have bigger gaps between their beliefs and online practices than others. When a high mean score on the 'imparting information' subset was used to delineate this sub-group (i.e. that the respondents' agreed/ strongly agreed that teaching was concerned with transferring information) it was found that seven of the eight respondents in this category were teaching in 'hard pure' or 'hard applied' (Biglan, 1973) discipline areas. This finding suggests that there may be disciplinary differences in online teaching beliefs and practices amongst expert teachers and this finding is an area of further study identified by this thesis.

This finding also indicates that aligned beliefs and practices are not a necessary precondition for successful teaching, as defined by the NTFS and Mahoney's (2011) comments suggest some dissatisfaction with the current scheme. Clearly the small sub-group of expert science teachers found in this study use more plural (Kinchin et

al 2009) teaching approaches than that recommended elsewhere and this may be to suit their particular disciplinary needs.

The expert teacher group are more likely to possess teaching qualifications than the non-expert group (59% compared to 57%), more likely to have taken part in online development activities (56% compared to 53%), and more likely to have taken part in other learning and teaching development activities (81.3% against 81.1%). As can be seen however the figures for these two groups are remarkably similar and so the recommendations to further professionalise university teachers may appear to be unfounded. The comparable figures for fellowship of the Higher Education Academy is notably different for the two groups (87% for expert teachers compared to 35% for non-expert teachers) but this figure is potentially misleading as all NTFs can gain automatic fellowship of the HEA as a result of their teaching award, and this cannot therefore be considered as a 'causal' factor.

7.4 Conclusion

The use of online learning environments by the non-expert teachers in this study indicates that they are not being used in ways extolled by the pedagogical literature in higher education. Amongst this group, OLEs are largely used to transfer information to students who appear to act as passive recipients of this knowledge. Practices do not appear to be associated with teachers' beliefs, which are more

orientated towards learning facilitation, but appear to be more negatively influenced by the teachers' working context. These teachers themselves highlight the diverse and multiple demands on their time as the major constraints, but also a general dissatisfaction with the technology itself and its ability to support student learning.

Expert teachers do appear to behave differently in OLEs. Their beliefs and practices were more closely correlated, but, nevertheless, were not perfectly aligned and gaps continued to exist. This study shows that expert teachers are more able to enact their beliefs and suggests that one contextual reason for this appears to be their interest in technology itself aligned with a belief in learning facilitation.

The study concludes that in order to enhance the quality of the student learning experience, possession of a teaching qualification should be re-emphasised alongside an ongoing system of teacher development which must be supported and reinforced by suitable institutional policies.

Chapter 8

Afterword: A Personal Reflection

The process of writing this thesis has had implication for the author. The nature of the thesis and the methodologies adopted required an objective stance in which the writer distanced themselves from their study in order to report their results impartially. The very act of writing in the third person is indicative of this approach. However, in this final chapter the author has determined to enter the conversation and report the impact of this study upon their thinking and practice. In order to do this most effectively there will be a shift into the first person.

As reported in the methodology I choose to research this area largely because of my role as an academic and staff developer within a university. It had been my experience that many academic staff did not 'practice what they preached' in terms of student learning and as part of my job role I was expected to promote online learning development within my university. At the outset I felt the present study would help me understand the reasons for reluctance and failure of online and blended learning experienced across the HE sector. My motivation was clearly to understand the problem so that I could find the means with which to influence teacher behaviour and increase effective practice within this area of activity.

I now appreciate that this position was flawed. I began with a belief that the use of OLEs was a positive force within HE, a development which could enhance the student experience if correctly managed by the HE teacher. I hoped that my research would help me identify the problems and enable me to carry out my job role more effectively. I did not take a neutral position therefore and sought, particularly in the early days of my analysis, to establish what was going 'wrong' with academic practice rather than considering the problem more holistically within its social context. In the ethics section of the methodology I state my concern that a deficit model is taken of university teachers in general and I now appreciate that I was, to some extent, also taking such a stance. My quantitative results only provided me with the 'what', a description of the current situation. It was scrutiny of the qualitative data which provided the 'why', i.e. the explanation for the practice which had been measured; this is ultimately the more important question. In this process my own position shifted as I was required to scrutinise my original assumptions and motivations in conducting the research. I was forced to confront the structural reasons for behaviour and their power in determining practice over which the individual university teacher has little agency. As Mason (2002) points out

> 'a researcher cannot be neutral, or objective, or detached, from the knowledge and evidence they are generating. Instead they should seek to understand their role in that process' (Mason, 2002:7)

The new knowledge which emanates from this study then includes a new understanding of myself and the assumptions I made at the outset of this study and

no doubt, elsewhere. The process then proves more powerful than the product. What matters is not what is found but how it is found and what that tells us about ourselves and the society in which we live.

My staff development role continues but unfortunately this study has not provided me with easy answers to the problems I had identified at the start of this thesis. I do believe that student learning can be enhanced by effectively designed online learning environments, but the complexity of reaching a situation in which such a scenario can occur is far from straightforward. This study has illustrated that one cannot separate the agentic and structural factors which influence behaviour and having data on one is of little practical use unless the other is also the subject of scrutiny. This study throws light instead upon the relentless push of capitalist agendas and the supplication of the individuals involved, including those investigating the phenomena, to accommodate these demands and seek solutions to the identified 'problem', rather than to question the question itself.

Ultimately then this research has been enlightening and redemptive for me. My task now will be to share these findings and hope to influence policies and procedures in a more measured and considered way.

Appendices

Appendix One

Email to Distributors

Subject: Online survey. Chance to win an Apple iPod Touch!

Dear colleague,

As a member of HELF (or other association*) I attach an email which I would like you to send on to all university teachers within your institution.

This email contains an embedded link to a 10 minute online survey seeking details of university teachers' use, or non-use, of online learning environments. To thank them for their participation they will be entered in to a prize draw for an Apple iPod Touch (worth £150).

This survey has been developed as part of my doctoral research and I will be happy to share findings from this research in the future.

To thank you for your time in distributing this link I would like to enter you into a prize draw for another Apple iPod Touch. Once you have distributed this email and associated link to your colleagues, email me to so that I can enter you in this draw.

Many thanks for your assistance,

Tessa

Tessa Owens

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L16 9JD

Tel: 0151 291 3819

***Email text introduction will change depending on their relationship with me.**

Appendix Two

Email to university teachers.

Subject: Survey of university teachers' beliefs. Chance to win an Apple iPod Touch!

Dear colleague,

I am conducting research into university teachers' beliefs about the use and non-use of online learning environments **for my doctoral studies.**

I would like as many perspectives as possible to be represented in this research so please complete the online survey, **by following the link below.** This should take around10 minutes **to complete. All completed entries, received by 4th January 2010, will have the chance to** win an Apple iPod Touch (worth £150)**.**

Survey link: http://www.surveymonkey.com/s/Y3FRLZ8

Many thanks

Tessa

Tessa Owens

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Appendix Three

Online Consent Form

Dear colleague,

As part of my doctoral studies I am undertaking research into university teachers' use and non-use of online learning environments, such as virtual learning environments and social network sites. The aim of this research is to develop a better understanding of university teachers' beliefs and practices associated with online learning.

Please complete this questionnaire whether or not you use online environments as part of your teaching. It will take approximately 10 minutes to complete. You will also be asked to consider taking part in a follow-up interview.

In order to preserve your anonymity and to thank you for completing this survey you will be redirected at the end of the survey to a new database where you can enter a prize draw to win an Apple iPod Touch (worth £150). The draw will take place on the 5th January 2010.

I will be happy to give all respondents a summary of what has been learned from this research. Raw data will only be seen by myself and I will not say, write or do anything that will enable anything you tell me to be attributed to you or your institution.

As I hope this research will help UK universities to enhance their support for teachers' work I will, where applicable, share the findings from this thesis at conferences and in academic journals.

Tessa Owens, Liverpool Hope University, L16 9JD. 0151 291 3819
Supervisor: Dr Melissa White, Centre for Labour Market Studies, University of Leicester.

If you are happy to participate in the study, as described here, please check the 'Yes' box below.

Appendix 4

Questionnaire

BELIEFS QUESTIONS (1-18)

Seek to assess teachers' self reported pedagogical beliefs. Questions used from instrument reported in Norton *et al* (2005)

Respondents asked to rate response on a likert Scale: Strongly disagree (1); disagree (2); undecided (3); agree (4); strongly agree (5)

BELIEFS: LEARNING FACILITATION

Problem Solving

1. Higher education should convert students from secondary-school type learning (e.g. memorisation) into tertiary type (e.g. problem solving)

5. The most important skill graduates can develop is the ability to carry on learning when they leave higher education

Interactive teaching

9. A good lecturer should incorporate student discussion as part of his/her teaching.

13. Lecturers should encourage participation from their students.

Facilitative teaching

8. Teaching is about providing an environment in which students are encouraged to do the learning themselves

Pastoral Interest

3. A good lecturer is one who recognises the personal needs of his/her students

7. Good lecturers should have a genuine interest in their students' well-being.

Motivating Students

10. It is really important that a lecturer is able to enthuse his/her students.

12. A good lecturer is one who can motivate students to learn.

BELIEFS: KNOWLEDGE TRANSMISSION

Training for jobs

2. The main aim of higher education should be to prepare students for their future careers.

14. An important function of higher education is to produce graduates for certain professions within the community.

Use of media

15. Lecturers present information more effectively if audio-visual materials are used.

17. New technology is going to revolutionise teaching.

Imparting information

4. A good lecturer is one whose main role is to impart information to his/her students.

6. Teaching is about the transmission of knowledge.

Knowledge of subject

11. It is fundamental that lecturers know the latest advances in knowledge related to their subject area.

16. A good lecturer has to be an expert in their subject matter.

Breadth of Use (Q18-26)

Which of the following do you use in interactions with your students? Y/N

18. Face-to-face teaching sessions (such as lectures, seminars, laboratories, field trips)

19. Telephone conversations

20. Email

21. A virtual learning environment (such as Blackboard or Moodle)

22. A Webpage(s)

23. Wikis

24. Blogs

25. Social network site(s) (such as Facebook or Twitter)

26. Other

Frequency of Use

27. How often do you use online learning environments (VLEs/Social Networks) to interact with your students?

Daily/weekly/fortnightly/monthly/rarely/never (skip logic to Q.45).

PRACTICES QUESTIONS (Q28-44)

Seek to assess teachers' self reported practices when using a VLE. Adapted from: Norton *et al* (2005) and Richardson *et al* (2007) and informed by Laurillard's (2002) 'Conversational framework' .

Respondents rate questions on a likert Scale: Strongly disagree(1); disagree(2); undecided

(30; agree (4); strongly agree (5)

PRACTICES: LEARNING FACILITATION

Problem solving

35. I use online environments to teach my students how to use logical and rational thinking.

42. I use the online environment to teach my students how to analyse information critically

Interactive teaching

28. I spend more time in online environments directing discussion than giving information.

30. I get students to participate in online discussion as much as possible.

Facilitative teaching

31. One of my principal aims in the VLE is to provide an environment in which students are helped to 'learn for themselves' rather than be taught.

Pastoral Interest

32. I use online learning environments to keep in touch with students' pastoral problems.

37. I use online environments to show that I am concerned with my students' well-being

Motivating students

33. I use online environments to encourage my students to become self-motivated individuals

40. In my online environment I spend much of my time trying to present subject material in a way which will stimulate the interests of students.

PRACTICES: KNOWLEDGE TRANSMISSION

Training for jobs

36. I use online environments to ensure that by the end of their course my students will be well qualified in their particular subject.

41. I use the online environment to prepare students for the roles they will have when they leave the institution

Use of media

29. I use audio-visual stimuli in online environments.

44. I use online environments to expose my students to new technologies.

Imparting information

34. I use the online environments to pass on what information I know to students.

39. Within the online environment I give as much information as possible to my students.

Knowledge of subject

38. To prepare for my online environment I spend a lot of time ensuring that I have

a thorough knowledge of my subject.

43. For my online teaching I keep abreast of my field of knowledge all the time

Non-Users (skip logic question)

45. Please briefly explain why you do not use online learning environments to interact with your students (open essay box)

Personal questions (Q46-52)

46. Gender

47. Age

48. Subject taught (This question will use Biglan's (1973) cognitive dimension model of academic disciplines, hard v soft, and pure v applied to assess differences in responses by different disciplines.

49. Years teaching in HE

50. Do you have a teaching qualification?

51. Are you a member of the Higher education Academy?

52. Have you had any formal development in the use of online technologies?

53. Have you had any formal development in teaching and learning practice?

54. Is your university: A Pre92; Post92; Don't know

PRIORITIES QUESTIONS (Q55-63)(after Fanghanel 2007)

Likert Scale: High/Medium/Low Priority

55. What priority is given to using online environments by your university?

56. What priority is given to using online environments by your department?

57. What priority is given to using online environments by your subject?

58. What priority do you give to using online environments as part of your teaching?

59. What priority is given to teaching and learning within your university?

60. What priority is given to teaching and learning within your department?

61. What priority is given to teaching and learning within your subject?

62. What priority do you give to teaching and learning?

63. Any comment you would like to make

USE OF TECHNOLOGY QUESTIONS (Q64-69)

These questions seek to assess the level of individual use of technology, or 'techno-phobia', in academics personal and social life. (Kasik, 2002; Lloyd and Albion 2009) This is a frequently attributed 'problem' in some literature.

64. How often do you use new technologies (such as mobile phones, and digital recording equipment) in your personal / social life?

Daily/weekly/occasionally/never

65. Do you enjoy using new technologies in your personal / social life? Y/N

66. Do you need to learn to use new technologies in your teaching? Y/N

67. Do you want to learn to use new technologies in your teaching? Y/N

68. Do you feel you have enough time to develop use of new technology in teaching? Y/N

69. Any comment you would like to make

Appendix 5

Descriptive statistics showing Skewness and Kurtosis for Non-Expert sample

Descriptives

			Statistic	Std. Error
TotalBeliefs	Mean		66.84	.280
	95% Confidence Interval for Mean	Lower Bound	66.29	
		Upper Bound	67.39	
	5% Trimmed Mean		66.89	
	Median		67.00	
	Variance		41.466	
	Std. Deviation		6.439	
	Minimum		31	
	Maximum		85	
	Range		54	
	Interquartile Range		8	
	Skewness		-.509	.106
	Kurtosis		2.426	.212
TotalPractices	Mean		53.27	.497
	95% Confidence Interval for Mean	Lower Bound	52.30	
		Upper Bound	54.25	
	5% Trimmed Mean		53.89	
	Median		55.00	
	Variance		130.593	
	Std. Deviation		11.428	
	Minimum		17	
	Maximum		80	
	Range		63	
	Interquartile Range		13	
	Skewness		-.873	.106
	Kurtosis		1.162	.212

Appendix 6
Kolmogorov- Smimov test of Normality: Non-expert sample

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
TotalBeliefs	.072	529	.000	.974	529	.000
TotalPractices	.107	529	.000	.952	529	.000

a. Lilliefors Significance Correction

Appendix 7
Descriptive Statistics for Beliefs and Practices subsets

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
BELIEFS					
Problem Solving	529	2	10	8.78	1.158
Interactive Teaching	529	3	10	9.06	1.099
Facilitative Teaching	529	2	10	8.91	1.271
Pastoral Interest	529	2	10	8.21	1.358
Motivating Students	529	2	10	8.92	1.189
Training for Jobs	529	2	10	6.88	1.647
Using media	529	2	10	6.68	1.639
Imparting Information	529	2	10	6.02	1.976
Knowledge of Subject	529	3	10	7.84	1.422
PRACTICES					
Problem Solving	529	2	10	6.16	1.955
Interactive Teaching	529	2	10	5.05	1.944
Facilitative Teaching	529	2	10	7.52	2.024
Pastoral Interest	529	2	10	5.19	1.991
Motivating Students	529	2	10	7.16	1.767
Training for Jobs	529	2	10	5.98	1.794
Using media	529	2	10	6.23	1.960
Imparting Information	529	2	10	6.75	1.799
Knowledge of Subject	529	2	10	6.99	1.856
Valid N (listwise)	529				

Appendix 8

Mahalanobis distances for Non-expert MANOVAs

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	217.42	319.15	277.17	13.819	529
Std. Predicted Value	-4.323	3.038	.000	1.000	529
Standard Error of Predicted Value	7.156	49.116	14.827	4.855	529
Adjusted Predicted Value	200.30	325.76	277.09	14.067	529
Residual	-285.396	290.098	.000	159.851	529
Std. Residual	-1.779	1.808	.000	.996	529
Stud. Residual	-1.783	1.816	.000	1.001	529
Deleted Residual	-286.682	292.668	.071	161.403	529
Stud. Deleted Residual	-1.786	1.820	.000	1.002	529
Mahal. Distance	.052	48.471	3.992	3.904	529
Cook's Distance	.000	.024	.002	.002	529
Centered Leverage Value	.000	.092	.008	.007	529

a. Dependent Variable: ID

Appendix 9

Descriptive Statistics for Expert sample showing Skewness and Kurtosis

Descriptives

			Statistic	Std. Error
TBeliefsLFKT	Mean		66.2813	1.12543
	95% Confidence Interval for Mean	Lower Bound	63.9859	
		Upper Bound	68.5766	
	5% Trimmed Mean		66.6875	
	Median		66.0000	
	Variance		40.531	
	Std. Deviation		6.36642	
	Minimum		48.00	
	Maximum		75.00	
	Range		27.00	
	Interquartile Range		8.50	
	Skewness		-.808	.414
	Kurtosis		.858	.809
TPracticesLFKT	Mean		59.9688	1.81697
	95% Confidence Interval for Mean	Lower Bound	56.2630	
		Upper Bound	63.6745	
	5% Trimmed Mean		59.7708	
	Median		57.0000	
	Variance		105.644	
	Std. Deviation		10.27833	
	Minimum		40.00	
	Maximum		82.00	
	Range		42.00	
	Interquartile Range		15.75	
	Skewness		.403	.414
	Kurtosis		-.268	.809

Appendix 10

Descriptive Statistics to show mean scores and standard deviations for expert teachers' beliefs and practices subsets

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
BELIEFS					
Problem Solving	32	4.00	10.00	8.81	1.22967
Interactive Teaching	32	6.00	10.00	9.00	1.16398
Facilitative Teaching	32	6.00	10.00	9.06	1.243
Pastoral Interest	32	4.00	10.00	8.78	1.28852
Motivating Students	32	5.00	10.00	9.16	1.16700
Training for Jobs	32	2.00	10.00	6.75	1.83162
Using media	32	2.00	10.00	7.03	1.85758
Imparting Information	32	2.00	9.00	4.41	1.99773
Knowledge of Subject	32	4.00	10.00	7.81	1.37811
PRACTICES					
Problem Solving	32	4.00	10.00	6.97	1.63597
Interactive Teaching	32	3.00	10.00	6.75	2.07908
Facilitative Teaching	32	6.00	10.00	8.63	1.289
Pastoral Interest	32	2.00	10.00	6.00	2.12512
Motivating Students	32	6.00	10.00	8.00	1.24434
Training for Jobs	32	4.00	10.00	6.97	1.75029
Using media	32	3.00	10.00	7.44	1.72154
Imparting Information	32	4.00	10.00	6.22	1.56028
Knowledge of Subject	32	4.00	10.00	7.31	1.73089
Valid N (listwise)	32				

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