

**‘It’s my time now’:
An exploration of the relationship
between Foundation degree
students’ epistemological beliefs and
their emerging identity as learners.**

Submitted by Laura Osborne, to the University of Exeter as a thesis for the degree of Doctor of Education in Education, October 2012.

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Abstract

This thesis is an exploratory case study that investigates the epistemological beliefs of students' on a Foundation degree in Teaching and learning, and the possible influence of these beliefs on their learning. Critical realism provides the theoretical context for this case study through a multi-phase approach. This study explores the students' beliefs of knowledge, knowing and learning through the employment of questionnaires and in-depth interviews which reveals the stories and experiences of five of the students.

The research data suggests there is an apparent relationship between personal epistemological beliefs and the engagement with learning in higher education for these students. Moreover it emerged that there were personal transformations in their attitudes and beliefs towards knowledge, knowing and learning that had a profound impact on their self-belief. The changes can be attributed, in part, to the students' capacity for change-readiness and openness to learning mediated by the situated and contextualised nature of the learning environment.

Findings from this case study are not generalisable due to its specificity to one particular setting and small number of participants. However, a conceptual model of the relationship between students' epistemological beliefs and transformation is offered exposing the complexity of social phenomena in real-life settings.

The findings are discussed within the context of previous research. As part of my own learning, and in harmony with the theme of learning and change of the participants, I have also explored my learning changes as a result of engaging in my doctoral studies.

Acknowledgements

Without the help and support of the people I acknowledge below I may never have completed, let alone begun, this thesis.

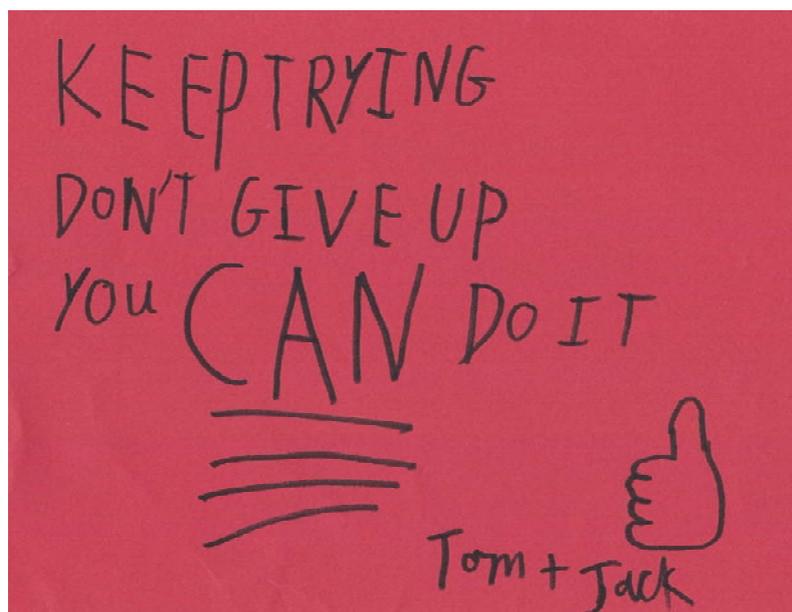
Firstly, thank you to all my participants. Your engagement and perseverance with your own learning was truly inspiring. I am particularly grateful to Emma, Liz, Maria, Nicky and Rachael for sharing their world with me; it was a privilege.

Thank you to my supervisors on this doctoral endeavour: to Prof. Bob Burden for starting me on this journey, and to Dr. Shirley Larkin thank you for your gentle but firm and patient nudges to the end. Your encouragement, questions and ideas along the way stimulated important changes and enabled me to define my research more succinctly; you showed me the way and made me believe it was possible.

To my colleagues, Anne and Nick, who gave me a new lease of life and allowed me to become the teacher I wanted to be, thank you.

Thank you to my two friends, Jo and Carina, for the welcome distractions you helped to provide.

Finally, thank you to my family. To my mother who gave me unconditional love and support as only a mother can, and told me to 'just get on with it!' To my boys, Jack and Tom, I did keep trying and now I have time to make those cookies and fudge! And to Richard, your belief in me I find astounding and I love you for that. Your patience, encouragement and love have sustained me the very end; I would not have made it without you all.



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Chapter 1: Introduction

*We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.*
T.S. Eliot - Four Quartets: Little Giddens

This study is concerned with the exploration of the relationship between Foundation degree students' epistemological beliefs and their emerging identity as learners and seeks to contribute to the understanding of the implications of epistemological beliefs on adult learning. The issue of personal epistemological beliefs has been the focus of a significant amount of research in the last 20 years (Baxter Magolda, 1992; Belenky et al., 1986; Buehl and Alexander, 2006; Feucht and Bendixen, 2010; Greene et al., 2010; Hofer 2001; Hofer and Pintrich, 2002, Schommer, 1990; 1994; Schommer-Aitkins, 2002, 2008). Research has been conducted throughout the spectrum of education from undergraduate students in higher education to, more recently, children in primary education, though much of this research has been largely carried out in the American or Australian education system. Schraw and Sinatra (2004) suggest epistemological research needs to expand to include participants beyond the typical college undergraduate. Foundation degree students could be considered as atypical students as they are recognised as a minority group in the system of higher education (Burke and Hayton, 2011). The Government rationale for the initiation of Foundation degrees in 2000 was clear and specific and aimed at a particular group of people who, for a number of reasons, previously had not been able to gain access to higher education (HEFCE, 2000). The engagement in higher education for many on a Foundation degree is a significant change in their life course. They bring with them the beliefs and assumptions about learning as do all undergraduates however these are compounded and exemplified by the reasons for their late engagement with higher education.

My belief is that learning is intricately and intimately entwined with one's personal epistemological beliefs. The research questions are therefore focussed on the role of knowledge and what it is to know within context of learning on a Foundation degree. This will help to develop a better understanding of the implications of epistemological beliefs for adult learning so I, as a tutor, can better facilitate and support the process for these students during the enormous life change and transition into higher

education. The study focuses on 36 students enrolled on a Foundation degree in Teaching and Learning in the south-west of England. The degree is validated by a university in the West Midlands and run in partnership with an educational institute based in the south-west of England.

The study has served two closely interwoven purposes: professional development related to theory and practice, and a profound personal growth. This has been a hermeneutic process where my understanding has been created and modified at the same time in an iterative course of developing meaning through the study. Whilst I was aware that professional change would occur I was not prepared for the significance of this change on a personal level. Therefore, reflecting these changes the thesis is presented with a proportional split between the theoretical and empirical elements. The initial chapters offer personal explorations of my developing understanding of the theoretical and philosophical underpinnings of the research process, followed by a fulsome account of theoretical and conceptual issues relating to the nature of epistemology. The interconnectedness of both is then threaded together in the presentation of the empirical elements and outcomes of my study. Drawing from T.S. Eliot I may not yet have arrived where I started but I have a better understanding now of where I have been in my explorations.

This chapter now places the study into a context recognising the perspective of Foundation degrees in the ideology of lifelong learning. I introduce the concept of epistemology and its influence on the learning of individuals and I discuss my approach and motivation for the study.

1.1. Context

Preparation for lives in tomorrow's world cannot be satisfied by a once-and-for-all acquisition of knowledge and know-how. The creation and application of knowledge play a considerably greater role in economic activity in the post-industrial economies, and is now widely seen in the West as the only possible sustainable source of competitive advantage (Field, 2004). Wells and Claxton (2002:1) recognise uncertainties and demands brought about by globalisation and advocate a reappraisal of the education system advising that 'yesterday is an unreliable guide to tomorrow' with the complexities and state of flux our society is experiencing. Furthermore the rise of the knowledge economy means the questions about the goals of education are more important than ever, raising the ideological question of the purpose of education

and whether it is for the benefit of the individual or the means of producing human resources necessary to maintain the economy (Somekh et al., 2005).

Whilst we use the term 'knowledge economy' education is not about the transmission of knowledge and, as Coffield (2000:12) warns, 'the transformative potential of lifelong learning is in danger of degenerating into training to serve the interests of global capital'. The notion that education is a springboard for prosperity is a narrow concept as learning clearly serves other purposes than just economic success (Ball, 1991). Nevertheless, as Clegg (2008) points out, governments worldwide are driven by the twin concerns of global competitiveness and the need to produce local, flexible, employable, workers as part economic strategies. Education has responded to these needs and in the last decade has brought about significant transformation in higher education, more specifically with the introduction of Foundation degrees.

With widening participation and raising attainment as high priorities for both the Higher Education Funding Council for England (HEFCE) and Learning and Skills Council (LSC), the government set a target that by 2010 50% of those aged between 18 and 30 should have the opportunity to benefit from higher education (HEFCE, 2001). To help achieve this Foundation degrees were introduced by the Department for Education and Skills (DfES) in 2000 to encourage those who previously may not have considered studying a higher level qualification (QAA, 2010). The rationale for the Foundation degree was 'to help education providers supply the labour market with the high quality graduates needed to address the shortage of intermediate level skills' (HEFCE, 2000b:3). This rationale clearly depends on the commitment of individuals and employers to continuing professional development to access the appropriate levels of qualifications and progress to new enhanced roles (Edmond et al., 2007).

To promote and support Foundation degrees Foundation Degree Forward (FdF) was launched in 2003 to improve the access and success of students from under-represented groups in higher education (Thomas, 2011). The Foundation degree provided a way to redress the under-representation of certain social groups in HE (Burke and Hayton, 2011) but in 2011 under the government the funding from Higher Education Funding Council for England (HEFCE) for this programme ceased. Nevertheless the success of the Foundation degrees so far has meant that a number of institutions continued to deliver Foundation degrees without the support of FdF (Thomas, 2011). However, Burke and Hayton (2011) warn the funding cuts may well

have implications in the future for those institutions that have a large proportion of students from lower socio-economic backgrounds (UCU, 2010).

1.2. Lifelong Learning

The ideology of lifelong learning is generally accepted as important for both intrinsic and extrinsic gains in today's learning society. The influential Dearing Report (1997) 'Higher Education in the Learning Society' proposed the aims of higher education should be to sustain a learning society. It states that learning should be for intrinsic rewards, 'to increase knowledge and understanding for [individuals] own sake' but also for extrinsic rewards for the benefit of the economy and society (Dearing 1997:para23). Hargreaves (2005), in the DEMOS Report 'About Learning', proposes that it is the years spent in compulsory education that should give people the motivation and the capacity to learn; hence, laying the foundations of lifelong learning for personal development both in the workplace and community. The rapid expansion of technology and the globalisation of knowledge demands that individuals need to have the capacity to learn to learn 'if they are to maintain their full and continued participation in employment and civil society or risk social exclusion' (Fredriksson and Hoskins, 2007:127). As Claxton (2006) advocates we need to move beyond the narrow focus of updating vocational knowledge and skills and further unpack the generic capacity to learn. To do this education has a role to ensure that all have a wide range of competencies and the ability to adapt to our rapidly changing world.

The move towards widening participation has meant an increased access to learning for a much wider cross-section of the population including those who embark on a Foundation degree. The pragmatic reality of life may have limited the engagement with education so individuals may possibly have paid an unknown personal and social price (Hargreaves, 2005). The Education Council (2006:13) calls our attention to the differing needs of such learners who 'due to educational disadvantages caused by personal, social, cultural or economic circumstances, need particular support to fulfil their educational potential'. As will be shown engagement in the learning society for many embarking on Foundation degree studies can be life changing: personally, professionally and academically.

1.3. What is a Foundation degree?

In 2000 the introduction of the new higher education qualification, the Foundation degree, was announced by David Blunkett, the then Secretary of State for Education and Employment. It is equivalent to level 5 within the *Framework for Higher Education Qualifications in England, Wales and Northern Ireland* (FHEQ) (QAA, 2010) with clear transition arrangements for progression onto an honours degree at level 6 (HEFCE, 2000b). The intention of Foundation degrees was to address shortages of the skilled, contribute to lifelong learning and enhance employability (QAA, 2010). This enabled the government to address the dual aims of raising workforce skills in a global economy alongside the aim of widening participation (Doyle, 2003). Leitch (2006) provides the rationale for a developing a workforce with world-class skills by 2020 anticipating a positive impact of such investment. Commencing in 2001 the new two-year qualification, available in a wide range of subjects, focused on supplying the skills employers needed (HEFCE, 2000b). It provided graduates for the labour market to address shortages in particular intermediate-level skills attracting people who would not normally have done a conventional three-year undergraduate degree (Wilson et al., 2005 in Harvey, 2009).

A key basis of the Foundation degree was the model of vocational higher education dependent on close collaboration between employers and providers of higher education, with an emphasis on the provision of a pathway for lifelong learning with work-based learning central to the design of the degree (HEFCE, 2000b; QAA, 2002). There was a potential tension between the needs of the employer to fill the intermediate skill level and the employee who wants to continue to study at a higher level. Nevertheless according to Higgins et al. (2010) a Foundation degree represents a commitment to social justice within our higher education system with the aim to widen and increase participation in higher education by the application and integration of appropriate academic rigour and work-based flexible modes of learning.

Additionally in education, there has been a modernisation and remodelling of the workforce leading to the 'professionalisation' of many roles (Brennan and Gosling, 2004:3 in Edmond et al., 2007). Specifically the redefinition of the work of support staff has been driven by the government's commitment to remodelling the workforce and the development of the role of school support staff (DfES, 2002). Teaching assistant numbers in England and Wales have trebled since 2000, with teaching assistants comprising a quarter of the workforce in mainstream state schools (Headteacher-update, 2011). This change in professional role opened a door to

learning for many, as education is one of the top three courses studied as a Foundation degree since 2006.

Initially in 2001, 4000 students enrolled on Foundation degrees; by 2009 this had increased to 99,475 students (HEFCE, 2010). This is only 525 short of the government target of 100,000 by 2010 set by the then Department for Innovation, Universities and Skills in 2004 (HEFCE, 2010). By 2006 there had been a creation of 2879 Foundation degrees since 2001 (Foundation Degree Forward, 2006). In the most recent data available (HEFCE, 2010) for the academic year 2008-2009 60% of students were studying full-time, and of these 64% were female. Today there are 2839 programmes available in a wide range of subjects (UCAS, 2012). Specifically the Foundation degree in this study provides an opportunity for people who are working with young people or children to develop their professional understanding, knowledge and skills whilst working or volunteering in an education context (TLI, 2010).

Foundation degrees made higher education more affordable, accessible and appealing to a broader range of people (HEFCE, 2000a). In 2006 the DfES set out the rationale for locally-based higher education in the context of improving access for low participation groups. For the students in this study on the Foundation degree a campus-based, conventional university education was not an option mainly due to financial, work and family constraints. The demographics and employee involvement as described by HEFCE (2000a) in education students nationally fall almost exclusively into a group defined by predominately female, studying part-time, employed and with much more diverse and less standard entry qualifications. In his review Harvey (2009) notes 65% of Foundation degree students are aged over 21 compared with 52% of the overall undergraduate population (HEFCE, 2008). The cohort in this study was all female and aged over 21.

Woolhouse et al. (2009) investigates shifts in economic, cultural and social capital for those undertaking a Foundation degree. Personal benefits included a perceived increase in self-confidence however the research exposed personal challenges and hidden costs, especially for working mothers. However, as will be shown in this study, whilst these personal costs and sacrifices are recognised they are outweighed by the increase in personal, professional and academic self-belief, so perhaps realising Blunkett's (2000) vision of 'accessible and flexible building block for lifelong

learning and future career success, which draws together further and higher education and the world of work'.

Ransom (1998) suggests that learning is the organising principle of society and it is through this that the socio-economic changes can be managed. However he argues that many do not fulfil their potential because of principles and assumptions which are constitutive of the education system. Ransom describes five characteristics of this system based on principles and assumptions about: educational institutions, the curriculum, the organising principles of the system, the learning process, and perhaps most importantly assumptions about who education is for. He suggests these five characteristics of education are being challenged and I propose the experiences of the Foundation degree students in this study can be exemplified through these five characteristics. Firstly, the structures of educational institutions are now more responsive to the needs of the clients they are designed to serve. Through the engagement of universities developing partnerships under the remit of widening participation higher education is being taken out into the wider community rather than the community having to come to the institution. The students in this study have enrolled on a Foundation degree in Teaching and Learning at a university in the Midlands yet they experience university life in a small town community college in south-west England. The study cohort is part of a larger cohort of students in the south-west of England who engage in higher education through partnership with the University. In the academic year 2010-2011 the south-west cohort formed 20% of the University's undergraduate population. In addition, the rigid system constrained by packets of time is slowly being eroded and more flexible teaching and learning hours according to the needs of the students is made possible. The face-to-face curriculum time is collapsed into an intensive day with additional and flexible electronic and blended learning support. The flexible teaching and learning hours support and enhance the relationship with a student's workplace. Secondly, the design of the Foundation degree curriculum, which has a wider concept of vocational preparation work alongside skills needed for the academic engagement with the theoretical underpinnings of education, allows students to relate theory to their practice in real time. This enables a more holistic view and a broader understanding of the vast field of the education of children and young people, through a reciprocal engagement with theory and practice. The specific integration of workplace tasks on a weekly basis allows time for both reflective and reflexive approaches to the theory that underpins educational practice. Thirdly, the organising principles of the system, again through widening participation and the flexible framework just described, has allowed more

people to engage with higher education than they otherwise might have. The impact of these decisions made by individuals is central to this study and discussed more fully later. Fourthly, whilst there is still a transmission of knowledge element to teaching and learning this 'traditional conception' is in the main being replaced by interactive and self-directed learning and teaching. The very nature of work-based learning necessitates the need for self-directed learning so ensuring the students develop their independent skills alongside a community of learners, who can provide mutual support. Finally, as Ransom asserts, the assumptions that education is a stage in life which takes place whilst young, is located within an institution with the main measure of success as academic achievement, is being eroded. This is perhaps key, as declared by a participant in this study 'it is my time now'.

1.4. A focus on epistemology

Criticality is one of the key learning outcomes of higher education. The Quality Assurance Agency for Higher Education (2007) makes this evident through the use of repeated language in their benchmark statements for undergraduate and postgraduate disciplines: critical thinking and judgment, critical analysis, critical reflection, critical awareness and self-critical practice. A goal of higher education is to help students deal with the complexities of a changing pluralistic world by teaching 'tools of wisdom', including critical thinking (Kuhn and Udell, 2001). Hofer (2001) and Moon (2008) suggest that to develop this notion of critical thinking in higher education an awareness and an understanding of the part epistemological beliefs play is essential.

Learning needs and the needs of learners have changed in the context of the shift and transformation in societal and economic forces. An understanding of knowledge and how knowledge contributes to learning is clearly necessary in today's learning society. Hofer (2001) and Bromme et al. (2010) consider epistemological thinking, our views about the nature of knowledge and knowing, to be a critical component of lifelong learning, both in and out of school. There is enough evidence, according to Feucht and Bendixen (2010), to suggest there is a critical role played by our personal epistemology in the learning of individuals and that effective learning may be affected by epistemological beliefs (Brownlee, 2001). Therefore, our everyday involvement with tasks and information is influenced by the beliefs we hold about knowledge and knowing. The assumptions we have, the judgements we make and our engagement with the learning process depends on our beliefs about knowledge and knowing. The

way students respond to new ideas and theories they are exposed to in new learning situations is influenced by their perception of learning, knowledge and knowing (Rule and Bendixen, 2010). Additionally learning is dependent on the structure and culture of the learning environment, or the epistemic culture (Bendixen and Rule, 2004; Tabak and Weinstock, 2008) and will also influence how students proceed. Learning depends on its congruence with students' cultural capital as well as a number of learner characteristics such as the attitudes to learning and future orientations, therefore we need to be aware of the notion that the 'individuals conceptions of knowledge and knowing are components of a complex and intricate belief system' (Buehl and Alexander, 2006:29).

In this climate of problems in education Buehl (2008) recognises that understanding students' beliefs about knowledge and knowing may seem trivial and esoteric. However, she argues that empirical findings demonstrate that beliefs about knowledge are related to other beliefs such as study strategies and academic performance. Hammer and Elby (2002) suggest that having a perspective on students' epistemological beliefs can provide an alternate lens for viewing their ideas and understanding, possibly enabling a better assessment of their needs to facilitate development and progression. Therefore, understanding how knowledge beliefs relate to other factors in learning environments may help students overcome barriers and build on successes as well as improve education as a whole. Thus as Brownlee (2003:89) argues 'teaching programmes aimed at improving learning in tertiary education may need to focus explicitly on participants' central values or epistemological beliefs'.

There is clearly the case for understanding our students' epistemological beliefs, but also our own. The influence of epistemological beliefs relate to us all but Murphy et al. (2007) claim that researchers studying the epistemological beliefs of individuals have not necessarily examined their own epistemological stances. Kuhn and Weinstock (2002) argue that depending on whether we base our judgements on our belief of facts, opinions or the consideration of fallible knowledge will make a significant difference to the influence of these judgements on our lives, and to those of our students. Furthermore Kuhn and Weinstock (ibid.:134) describe epistemological theories as 'theories-in-action' as in our everyday lives we are all required to make knowledge judgments and decisions; I explore my own theories-in-action in Chapter 2.

1.5. My approach to the study

Having addressed the conceptual rationale for this study I feel it is important to position myself and explain my interest in this area as it is important also to recognise the assumptions and the preconceptions that I bring to this work; indeed the person that I am. Someone once expressed to me that embarking on doctoral studies was not so much a journey but rather more an odyssey: I now fully comprehend the sentiment behind this. The metaphor is twofold: as a series of travels and adventures and, as in the story of Odysseus's adventures, a non-linear plot. The invigorating feeling of racing forward as the wind caught has also been tempered with the detection of the doldrums where efforts to get moving again were sometimes harder to engage with than the strong headwinds that often buffeted me back in the other direction. From the outset I had a destination but this was clearly constructed from naivety and ignorance. I am not even sure at this point if I arrived at a destination; it feels rather more like a stopping off place. The person who started this research is not the person who is writing it now. As I delved further into the conceptual, theoretical and philosophical underpinnings to this study there was a subtle but continual change in my thinking which both influenced the next steps and passed judgements on the place from whence I had come. To continue the metaphor further, I realise now the compass I was using to direct me was flawed in terms of my earlier thinking so setting me in inappropriate directions. Whilst I now appreciate how the research that underpins the study could have been conducted differently it is my responses to these directions and experiences that have brought me to this place now. On reflection I now believe my odyssey commenced long before my decision to do the Ed.D. through a number of critical episodes where challenge bought inspiration.

As a tutor in ITT I attended a lecture given by Guy Claxton on the notion of 'learning to learn' and realised, somewhat disturbingly, that I had become what McNiff and Whitehead (2002) call a 'living contradiction'. Being so caught up in the mechanisms and policy of higher education I realised that I had moved away from my centrally held beliefs and values of teaching and learning. In much of my practice I had become a classic example of the paradox of espoused theory being largely inconsistent with theory in practice (Agyris and Schon, 1974). Alongside this concern about my own practice I had become increasingly disturbed with the perceived focus on content rather than process of learning in our education system. I had the belief that the strategies I was currently employing were not as effective as I would wish and did not always fit with my philosophy for teaching and learning. However I began to

realise that I based my assumptions on my own surface and non-critical reflections of my own practice. This came to me quite clearly after my initial forage into the ideas of Brookfield. He states:

Assumptions are the taken-for-granted beliefs about the world, and our place within it, that seem so obvious to us as not to need to be stated explicitly. In many ways we are our assumptions. It is also something we instinctively resist, for fear of what we might discover. Who wants to clarify and question assumptions she has lived by for a substantial period of time, only to find out that they don't make sense? (Brookfield, 1995:21).

I realised I had not considered the truth or validity of the assumptions I held. I clearly needed to question and clarify my assumptions before I could move forward, aware this would leave me and my beliefs open to uncomfortable scrutiny.

Mezirow's (1991:4) view that there has been 'a failure to recognise the central roles played by an individual's acquired frame of reference through which meaning is construed and all learning takes place' also had resonance for me. I began to understand that my assumptions shaped my frame of reference. I consider my developed beliefs, by their very nature, to be subjective, bounded by my experiences, contexts and the lens through which I view the world yet began to understand they can be predicated upon unreliable assumptions (Mezirow, 1994). These thoughts and reflections, along with other changes to my professional life, placed me in a position of what Mezirow (2000) calls a disorientating dilemma which led to, what I consider, a time of transformative learning for me. Rawson (2000) argues that in the process of becoming a more effective learner there is a stage where the learner becomes conscious of his or her conceptions of the world, how these conceptions were formed, and how they may be changed. This, continues Rawson, requires the ability to challenge one's existing worldviews and their origins where the learner becomes involved in a self-reflexive learning process and personal transformation results. The concepts we develop to make sense of a complex world resonate with Mezirow's (1981:4) notion of 'personal paradigms for understanding ourselves and our relationships'. However, this was not a simplistic process and whilst it may represent change it does not necessarily signify growth. It seemed quite clear at that point that I had to look to myself first; to reflect on these assumptions and their origins, to consider how they influence my practice, before I could move forward. It was a time of uncomfortable emancipation!

With a realignment of my compass my course changed direction, tempered by a distinct shift in consciousness, followed, more slowly, by a shift in a way of being. I arrived at an island of critical reflection where my own beliefs were questioned as I began to focus on people's beliefs about learning and teaching. These disturbances brought me to the theory of knowledge: epistemology. This was the next stage of development and learning for me as I began to comprehend the significance of personal epistemologies. If these personal beliefs influence one's cognitive and metacognitive operations in a significant way, then they also influence how teachers conceptualise teaching and this will influence practice in the classroom (Chai, 2006). It was some time later having read Schommer-Aitkin's chapter in Hofer and Pintrich's (2002) book 'Personal epistemology' I noted her warning of challenges that may face someone new to the field of epistemology inquiry. The challenges to be faced were: 'facing your own epistemological beliefs; wrestling with your own epistemological beliefs as they come into your consciousness; and, realising that your present day thinking is only one more step down the road of understanding' (Schommer-Aitkin, 2002:103). Clearly a caution, but there was no real indication how turbulent and chaotic the voyage would be!

1.6. The study

There were two overarching, yet symbiotic, aims to this research. Firstly, there was the aim to explore with students in their first year of a Foundation degree in Teaching and Learning their perceptions of themselves as learners with respect to their beliefs about knowledge and self concepts as a learner. I wanted to understand and make sense of their experiences and meanings in relation to their learning so I would become familiar with some of the complex phenomena in the students' perceptions of themselves as learners and develop an understanding of their beliefs and relationship with knowledge and learning through their life stories. Whilst it was not my intention for this research to lead to generalisable knowledge and recommendations I wanted to ensure the research had applicability to the real world of people making life changes through the engagement in a Foundation degree.

Secondly, there was a personal aim. Whilst this study explores the influence of epistemological beliefs on Foundation degree students' learning it also needs to be seen in terms of my own personal goals and shifting worldview. The expectation for an Ed.D. is to provide a bridge between theory and professional practice, and vice versa. Whilst remaining a teacher throughout the study my place of work and role in

education changed therefore the research originally initiated, that involved real life issues concerning my practice, also changed. This transition, whilst problematic, opened up new possibilities and signposted new directions through the series of travels and adventures referred to earlier. This continued odyssey subsequently allowed me to interrogate and challenge my own meaning structures and assumptions about my profession of teaching and learning.

Phases of research

There is an exploratory purpose to this research as I seek to understand and describe some of the complex phenomena in these students' perceptions of themselves as learners through a perspective with its roots in social and cultural interaction. As is explained in detail in Chapter 4 the study evolved from an initial set of questions to three phases of research with their own questions (Figure 1.1). The phases of research are:

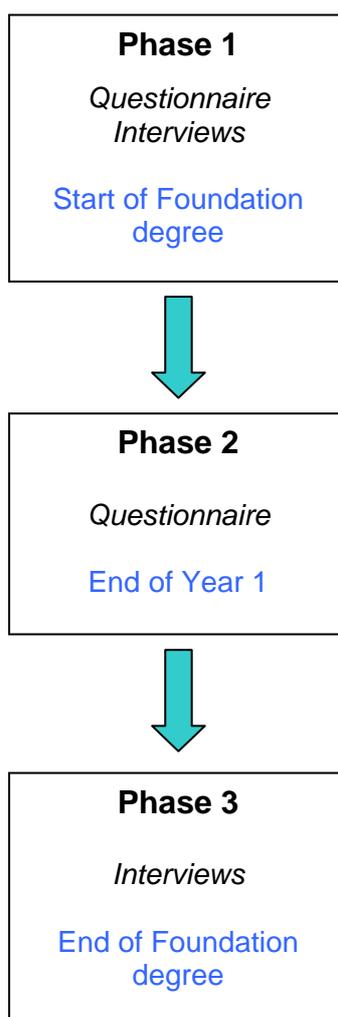


Figure 1.1 Three phases of research

Phase 1 research questions:

- 1 What beliefs do Foundation degree students hold about knowledge, learning and intelligence?
- 2 What is the relationship, if any, between students' epistemological beliefs and their engagement as a learner?
- 3 Is it possible to ascertain what these beliefs are so the strategies for teaching can be developed and therefore enhance University experiences accordingly?

Phase 2 research question:

- 4 Is it possible to ascertain any modification in epistemological beliefs over the course of a Foundation degree?

Phase 3 research question:

- 5 What are the implications of any change in beliefs over the Foundation degree?

The initial analysis of the data from the 3 phases moved the study on again and a further question emerged as the concept of transformation was revealed:

- 6 What is the relationship between students' epistemological beliefs and the occurrence of transformation?

In Chapter 2 I explore my own developing theoretical perspectives. Chapter 3 reviews the literature relating to the first 5 questions. As the notion of transformative learning with the participants did not arise until analysis question 6 and the theoretical literature is linked to the analysis in Chapter 6. In Chapter 4 details of the research design are given and Chapter 5 presents the data and the findings. The analysis is drawn together in the discussion in Chapter 6 with the conclusion and recommendations given in Chapter 7.

Chapter 2: A personal exploration of my approach to research

Knowing yourself is the beginning of all wisdom.

Aristotle

Although I later discuss the theoretical approach taken in this study I believe it will be beneficial to position myself as researcher at this point. Throughout my research I found myself engaging with an initially unrecognised philosophical debate and challenging my assumptions in an odyssey that has transformed my beliefs both personally and professionally. This has been immensely significant for me. I present my exploration as a temporal narrative to the position that finally underpinned this study.

2.1 Initial exploration of language and concepts

My understanding corresponds with Wellington et al. (2005:21) who state: 'It is impossible to take the researcher out of any type of research or at any stage of the research process'. However, in a previous life as a researcher in natural sciences this is not a position I took. Before re-entering the world of education as a primary school teacher I worked as a structural geologist using palaeomagnetic dating techniques and satellite imagery to investigate the movement of the Earth's crust. This was pure scientific research, which, by its very nature, operated in the scientific paradigm necessitating a positivist theoretical perspective. Although this perspective was unarticulated at the time I did not appreciate there was any other way of engaging with research; it was never discussed. This was not to say that in my own life course I did not challenge the notion of this yet unnamed absolute positivism. My view of science was not that of the reduced, impoverished notion of positivism. In retrospect I consider the theoretical perspective in my research life at the time as a scientist as possibly post-positivist. I always tended toward the notion that truth is relative to some particular personal frame of reference and was conscious that my observations and interpretations were theory-laden and biased by my own experiences and assumptions, even though my subjects were rocks! I understood these to be subjective perceptions and they could well change depending on further

interpretation or the introduction of 'new' evidence; this was not a position always appreciated by all in the world I then inhabited. Theoretical conceptions are embodied with a language shared within a cultural and social understanding, yet at times, there was a chasm dividing my beliefs with those of the shared scientific world, where I felt like an outsider from those within who had a special password to understanding.

The morphing of my career from an Earth scientist to teacher of primary school children, then to teacher of teachers brought about a significant shift and possibly a homecoming to my unarticulated, underpinning worldviews. However, there were still passwords into this world and I struggled to gain entrance until I realised I could choose my own password. As Pring (2000) explains how we can see things is embodied in a language and is inherited by us who learned the language. Therefore to gain entry to this world of social science research it became apparent that I needed to make sense of the language and assumptions used.

In an attempt to further my understanding it was a relief to read Crotty's (2003:1) reassurance that even 'seasoned campaigners' of research can become confused when faced with the maze and contradictions of terminology and underlying philosophies in the literature. For example, Crotty proposes there are four elements of the research process: epistemology (the theory of knowledge that is what it means to know), theoretical perspective (philosophical stance which provides a context of research through a set of assumptions), methodology (a strategy, plan of action or process) and methods (techniques or procedures), and that ontology (the study of being) sits alongside epistemology. Each category is linked and informs one another. Comparably Scott and Usher (1999) differentiate between ontology, epistemology, strategy and methods, yet Strauss and Corbin (1998) focus on methodology and methods. However, Cohen et al. (2007), drawing on Burrell and Morgan (1978), describe four sets of what they call assumptions: ontology, epistemology, models of human nature, methodology. They then go on to present three methodological lenses through which practice of research can be examined, yet these would come under Crotty's heading of theoretical perspectives. Pring (2000) uses the term philosophical positions instead of theoretical perspective whereas Guba and Lincoln (1994; 2005) use similar categories as Crotty but use the term paradigm in place of theoretical perspective. Under an engaging subheading of 'dodging definitions', Greene and Hall (2010) present a holistic understanding of what constitutes a philosophical paradigm in that it includes the issues of ontology, epistemology, methodology, and axiology

relevant to the practice of social science yet not inviolate or fixed. They defend their position with the notion that paradigms are social constructions, born out of historical and cultural practices. Biesta (2010) considers paradigms an unhelpful notion. He suggests when the notion of paradigms brings together a range of ideas and assumptions that do not necessarily go together there is a danger of the whole becoming more important than the parts. Moreover Gorard (2010:244) suggests that the concept of paradigm has become a 'cultural cliché with so many meanings it is now almost meaningless'. Perhaps then it is better to use the notion of worldview that encompasses one's assumptions and beliefs that one brings to research or, as Biesta (2010) suggests, a focus on individual philosophical assumptions rather than paradigm packages so producing generative insight and meaningful engagement across boundaries.

These examples demonstrate some of the disparities at the philosophical level as well as the technical. Therefore, whilst recognising the abundant debates and controversies in the literature I decided, as a beginning social science researcher, to use the terminology proposed by Crotty (2003) whilst drawing on Biesta's (2010) notion of philosophical assumptions. This is not to say that other opinions are ignored rather they are subsumed within this framework with reference to my developing understanding.

The approaches I applied initially to my study were based on my own implicit and partially recognised assumptions. Yet it was paradoxical that although my research was positioned around the notion of epistemology I had initially situated myself in the frameworks proposed by Schommer (1990, 1998) and Baxter Magolda (1992) but I had not fully considered my philosophical assumptions that underpinned this or the approach I was taking. I began to realise that my own particular worldview would influence assumptions about my research. Trowler (2009:5) cautions against allowing 'one's professional identity to become bound by a particular theory', however I had not previously subjected my worldview to scrutiny. I became aware, as a researcher working within the social theoretical context, I needed to understand better my own assumptions. What follows is the growth in my own understanding of my ontological and epistemological assumptions in relation to my study.

2.2 An understanding of my ontological and epistemological framework

We are reminded by Cohen et al. (2005) that there are many different ways of looking at social reality, and these are dependent on our interpretations and assumptions. Justification and choice of a 'way of research' is based on the assumptions we bring to our research. Our philosophical stance in terms of our ontological and epistemological beliefs in turn shape these assumptions and the researcher's frame of reference so contributing to how social scientists view and construct research, driving the researchers' choice of the theoretical perspective, methodology and method (Brannen, 2005). I found it worth remembering Bryman's (2008) interpretation of the relationship between the ontological and epistemological issues and research practice which, he says, represent tendencies rather than definitive point of correspondence. This relationship reflects the beliefs we have about the nature of reality which has an influence on the way that we can know it. However, it is not possible to step outside our own framework and adopt an objective approach to this, but it is essential we understand our own position and beliefs so we may articulate the theoretical framework in which we are working to ourselves and others.

My ontology

Our ontological beliefs describe an understanding and therefore a structure of reality that is commensurate with our ideas about the essence of existence. The kind of ontological assumptions we bring to our research are important as they can determine what kind of knowledge we are looking for (Biesta, 2010). A realist ontology has the belief that objects exist independently of thought: an objectivist world. In contrast, an idealist believes that nothing exists outside the mind, and that it is thought and ideas that construct reality: a subjectivist world. Guba and Lincoln (1989) take this notion further, denying the view of reality where there is a world that exists independently of the researcher, and see reality as socially constructed where there can be multiple realities: that is a relativist ontology. If we imagine realism and idealism occupying contrasting areas of a 3-dimensional space rather than diametrically opposed, then I can visualise closer to the idealist's space the notion of relativism. In this space there are multiple constructed realities (Guba and Lincoln, 2005) where reality depends on a particular frame of reference.

I can accept in part the notion of idealism where people's own perceptions construct their reality, where their truth can be just as valid as the next person. However, I

cannot conform to the idea that that is all i.e. there is no reality pertaining to the physical world. If so, idealism would mean there is no reality beyond that which we create; this is not within my schema. No matter how we perceive the reality of social objects there are aspects that are unresponsive to how we know them. The world exists regardless of what we happen to think about it (Sayer, 2000). Yet I cannot subscribe to the objective realist notion that all reality is mind-independent. I agree with Sayer (2000) who states quite clearly the notion that realism claims unmediated access to the truth is a naive misconception. However, in posing the question does realism assume objectivism, Crotty (2003) suggests that accepting *things* exist independently of our consciousness does not imply *meanings* exist independently of consciousness. In terms of the relativist ontology I also cannot concede there are multiple realities. However Pring (2000:52) advises 'it is not that there are multiple realities. Rather are there different ways in which reality is conceived'. According to Sayer (2000:48) 'relativism appears to have the virtue of being egalitarian and open-minded' therefore avoiding a fear of absolutism with the necessity of distinguishing truth from falsity. However, as Sayer advises, it is necessary to see the relativist premise in terms of epistemological equality and not social and moral equality. Furthermore Pring (2000) contends that each person lives in a world of ideas through which their physical and social world is constructed and that they cannot step outside this world of ideas to check for accuracy. Therefore, there is a negotiation of respective worlds of ideas where a consensus is reached. Pring (2000) claims that although the world we see does depend on the ideas we have inherited there is no reason to subscribe to the absolute stance that reality is a social construction.

This left me bouncing in this 3-D space until I was introduced to the concept of critical realism. The idea that there is a reality that is independent of our thinking that can be studied by science initially appealed to me. Critical realism describes observation which is fallible, interpretations that are theory-laden as we are biased by our cultural experiences and worldviews, but suggests theory is revisable (Robson, 2002). I do not believe that the reality of the research can ever be entirely separated from the researcher; even during my engagement with the natural sciences, I believed this was true. According to Sayer (2000:47) critical realism accepts 'epistemic relativism' as the world which can be known in terms of available descriptions or discourses, however it rejects 'judgemental relativism' in that one cannot decide that some accounts and discourses are better than others. The claim that an entity can exist independently of our knowledge of it whilst there is a subjective access to the social world (Bryman, 2008) is something I found appealed to my developing understanding.

It is not possible for the researcher to stand outside of the research but, as Sayer (1992) argues, critical realism enables the researcher's positionality to be made explicit.

Again I found myself returning to Crotty (2003) who does not see the social world and the natural world as two distinct worlds rather he considers that they are as one. Crotty's point being that the starting point for both natural scientists and social scientists is an already interpreted world. The natural world, he considers, has no meaning until meaning is given to it; demonstrating perhaps a superior view of human constructs. Although I believe things do exist independently of us I would also argue the natural world can ascribe its own meaning to certain objects. It is how we interpret these meanings and accommodate their meaning into our own structures which brings us our own individual truth. Moreover I would argue that individual truth does not have to deny the reality of an objectively existing world. Not all in our physical world can be negotiated, things happen without human interaction; we draw understanding from these processes. I fully conform to the idea that we need to make sense of our surroundings in an ambition to reach Piaget's notion of equilibrium. I understand the notion of making sense of situations through constructing connections, meanings and frameworks, so creating an 'agenda for negotiation' (Guba and Lincoln, 1989:13).

Although this study engages in social science research my worldview has to conceptualise my whole world, natural and social, to come to understand my ontological and epistemological beliefs. I found both fault and satisfaction in all these ontological positions and whilst I recognise that at different times I tend towards one or the other, I still cannot initially place myself firmly with any position. Drawing on the metaphor of Indra's web the complexities and interconnectedness of the philosophical and conceptual underpinnings are reflected by the whole of my beliefs not just part, as do the crystals captured in the web.

My epistemology

Hovering somewhat hesitantly in my ontological space I now turn to my epistemological beliefs. Initially my developing understanding of epistemology found congruence with Schommer's (1990) multidimensional approach. I could identify with the notion that, depending on the context and the degree of prior knowledge, beliefs differed. I did not equate my personal knowledge construct as unidimensional; rather

as an organic development with multidimensional facets. I realise now my consideration of the philosophical perspective of my epistemology was rather limited and was just a prologue to my developing understanding.

Epistemology, the theory of knowledge, asks about the nature, acquisition and limitations of knowledge. Murphy et al. (2007) consider that researchers must possess a tacit, if not explicit, understanding of their own epistemological beliefs as one's own implicit epistemological stance will manifest itself when interpreting data. Furthermore Cohen et al. (2005:7) suggest that it is 'how we align ourselves to this debate will affect how one will go about uncovering knowledge of social behaviour' but also warns that these stances are not watertight. An understanding of my own epistemological beliefs was therefore paramount. Crotty (2003) provides a philosophical grounding for a range of epistemological positions; this grounding can be seen as objectivist, subjectivist and constructivist.

An objectivist approach is aligned to the empirical nature of natural sciences therefore is not always seen as appropriate for research in the social sciences. This is because the actions of the objects, that is the observable behaviours of human beings, do not follow the causal explanations applicable in the science context (Pring, 2000). Situations and behaviours need to be interpreted as these realities exist in the minds of those involved; the reality is constructed by the interpretations of actions of the objects which cannot be constructed objectively. An objectivist approach leads to the oversimplification or reduction of human experience and the objectification of the human person: an approach I wish to avoid. I consider it arrogant to assume that the 'window into the inner lives' (Denzin and Lincoln, 2005:21) of individuals is open for objective scrutiny. The window needs to be opened by the individual and even then the filters of language, gender, etc. will modify the gaze. An objectivist epistemology aligns itself with the realist ontology however Crotty (2003:10) draws our attention to scholars who, although having a realist ontology and invoke a 'world always already there', are far from being objectivists. I take Denzin and Lincoln's (2005:31) belief that 'there are no objective observations, only observations socially situated in the worlds of - and between - the observer and the observed' and apply it to social situations while still believing there is a natural world already there. We cannot be objective about our interpretations as we view the world through a lens, or indeed sets of lenses, bestowed on us and constructed by us from our interaction with society and our culture. As Sayer (2000:12) argues 'observability may make us more confident about what we think exists, the existence of itself is not dependent on it'.

Alternatively, in subjectivity perception is seen as reality where meaning is created. Here meaning is imposed by the subject on the object, there is no interaction between the two, and the object does not contribute to the generation of meaning (Crotty, 2003). Although Pring (2000) argues we each inhabit our own subjective worlds of meaning where the social world is our interpretation, this construct does not sit with my engagement with social research where I see the object as the participant so contributing to the research.

Whilst recognising there is a distinction between the objective world and the subjective world, Pring (2000) drawing on Dewey, suggests that the concepts are too complex for such a division and there should be an integration and overlapping of the two. Crotty (2003) suggests this describes the epistemological position of constructivism. Constructivism is the belief that reality is individually or socially constructed. There is the concept of intentionality inherent in constructivism, where there is an intimate and active relationship between the subject and the object (Pring, 2005); it is through this engagement that meaning is born. As Pring (2000) explains behaviours have an intentionality so there is a need to understand intentions to understand behaviours. Although I agree to a point this can surely only be when intentions are conscious. I would contend that some behaviours are manifested from the subconscious, therefore we cannot know their intentions or possibly even their motivations, but we can learn the person's interpretations of the event or behaviour. As Denzin and Lincoln (2005) suggest individuals can only offer accounts and are seldom able to give a full explanation of their actions or intentions. As with subjectivism, constructivist reality is based on perceptions and interpretations but through engagement and interaction between object and subject, therefore participants can be seen to construct reality with the researchers.

Although favouring the constructivist approach I have difficulty with this epistemology as an absolute. Though constructivist epistemology can have a realistic ontology it tends to favour a relativist ontology, where truth is not absolute but changes relative to a particular frame of reference. Whilst this is something I can agree with to a certain extent I find myself at odds with the incommensurability of these multiple perspectives and multiple realities. However I appreciate the need to recognise that different people inhabit different worlds. This, Crotty (2003) suggests, will enable us to question understanding of truth and treat our understanding and knowledge as historically and culturally affected interpretations.

I return again to the position of critical realism which tends towards a constructivist epistemology that maintains there exists an objectively knowable, mind-independent reality, whilst acknowledging the roles of perception and cognition (Sayer, 2000). Robson (2000:42) proposes that critical realism is a way forward in real world research, as a moderation between the empirical post-positivist paradigm and the relativistic constructivist approaches.

I am very aware that I am trying to find 'names' for my ontological and epistemological beliefs without knowing and fully understanding what is 'out there' yet. I defend my position so far by acknowledging the vastness of this debate and articulating my emerging understanding of this; I place myself at the stage of conscious incompetence with the knowledge that there is more yet to come.

2.3 The present

I have come to understand that one definition of research practice is not superior to another nor that they should be thrown together to create a 'multi-paradigm methodology' to achieve some 'rounded' or 'complete' understanding but where 'insights afforded by one can stimulate thought in the other' (Bloomer and James, 2001:7). Guba and Lincoln (1989) posit the notion of negotiation within an 'academic marketplace of ideas' where 'negotiation of meaning can only be conducted within a framework of shared meaning' (Pring 2000:53). I found this perspective appealing as it appeared on reading some of the recent literature that if my beliefs resided within one approach I must therefore automatically reject another; this was perplexing to me. Rather than a world of separateness and dichotomies Wheatley (1999:158) describes rather poetically a 'world of exquisite interconnectedness'. Again the image of Indra's web is captured, demonstrating through the webs of interconnectedness a portrayal of a world of behaviour networks and the importance of context. Hammersley (2007:293) believes rather than coming to the research with fixed philosophical assumptions and assumptions about research practices researchers acquire their assumptions 'consciously and unconsciously, more or less simultaneously' where each shapes the other. This notion of connectedness and the position of context was prominent in all my thinking. Indeed in trying to reach an understanding of my ontological and epistemological beliefs it has brought me closer to a coherence (Morton, 2003) of beliefs that make sense individually and as a whole. This is not to say that my mind will be closed to new ideas; I anticipate quite the

reverse. Constant negotiation of ideas and meanings therefore creating new agreement based on the current understanding bring us social constructions that are constantly reconstructed as new experiences and force us to reshape how we understand things (Pring 2000:56). This will perhaps give me the password I was initially missing and enable me to engage with the world of research as an insider.

It is only through my developing understanding that I now tentatively ascribe my current beliefs to that of critical realism using Robson's (2002:42/3) understanding as:

A way forward, acknowledging that positivism has been discredited but avoiding the divorce from science implied by a thoroughgoing relativist approach. It seeks to achieve a detente between the different paradigms of the post-positivist approach within the empirical tradition on the one hand, and less thoroughgoing versions of relativism found in some constructionist approaches on the other.

Moving from objects of the natural world that do not have opinions or make judgements to people with their own subjective realities shaped by their ideas and interactions with the real world, compounded by a different set of ethical concerns, has been a confusing, yet enlightening, expedition. I will be interested to see how my perspective continues to alter as I engage further with social science research. I am fully aware that this is not the end but just beginning. In presenting my odyssey I would like to borrow from Guba and Lincoln (2005) the right to get smarter or indeed change my mind.

Chapter 3: Literature Review

*When I use a word,' Humpty Dumpty said in rather a scornful tone,
'it means just what I choose it to mean -- neither more nor less.'
'The question is,' said Alice, 'whether you can make words mean so many different things.'
'The question is,' said Humpty Dumpty, 'which is to be master - that's all.'
Lewis Carroll - Through the Looking Glass*

Theoretical and conceptual issues regarding the nature of epistemology and epistemological beliefs are raised throughout the literature, both terms are used quite differently by philosophers and psychologists (Sandoval, 2005). There are a complexity and diversity of labels, multiple and varying definitions of epistemology and epistemological beliefs, (Alexandra and Sinatra 2007; Hofer, 2001; Pintrich, 2002; Schommer-Aitkins, 2002, 2008). The lexicon of terminology including epistemological beliefs, epistemic beliefs, personal epistemology and so on, are further confused by the diversity of approaches applied to the construct of epistemology. As Pintrich (2002) explains empirical attempts at defining the constructs are possibly constrained by the theoretical assumptions of the different models and the different methodological approaches. Indeed the number of frameworks in the literature underscores the multifaceted nature of knowledge beliefs, indicating a construct that is both complex and elusive and therefore difficult to represent (Buehl and Alexander, 2006). Murphy et al. (2007) caution to those who are unfamiliar with contemporary philosophical and writings of such complexities was sound advice as I began to untangle the intricacies in contemporary research literature. This 'conceptual wobbliness' is, according to Alexandra and Sinatra (2007:223), due to the relative newness of research into this area. They, therefore, advise it is vital for researchers to make their operational and conceptual parameters clear for their key constructs. Thus I now present a summary of my understanding of the theoretical and conceptual issues underpinning epistemological belief structures.

3.1. Epistemology

Epistemological theories are historically based on the belief that the nature of knowledge, such as structure, certainty and source of knowledge, is developmental and unidimensional (Perry, 1970; Baxter Magolda, 1992; Belenky et al., 1986). Multidimensional theories then emerged with Schommer (1990; 1994) proposing

multidimensional and asynchronous development. Schommer offered an epistemological belief system of more or less independent beliefs that developed with varying degrees of sophistication. Similar models emerged which represent thoughts that developmental change varies across a range of epistemological beliefs (Schraw et al, 2002; Wood and Kardash, 2002); whilst others considered domain or discipline specific epistemological beliefs (Buehl et al., 2002; Hofer, 2000; Jehng et al., 1993; Paulsen and Wells, 1998; Schommer and Walker, 1995; Hammer and Elby 2002). Attempts have been made to bring research together, for example Bendixen and Rule (2004), Hofer (2004), Greene et al. (2010) propose an integrated model so gaining a better understanding of the educational relevance of personal epistemology.

In their critique of these existing models Hofer and Pintrich (1997) highlight the discrepancies in naming the construct as well as defining the construct in terms of the boundaries and what is included or excluded; they question whether researchers are even discussing the same intellectual territory. Moreover, Pintrich (2002) suggests, different labels used in different research highlight the possibility of different understandings of the nature of epistemological beliefs. The problems in conceptual clarity lead to difficulties in 'developing a coherent and cumulative body of knowledge' (Pintrich, 2002:392) which makes summaries and generalisations about the development of epistemological thinking across research studies problematic. According to Alexander and Sinatra (2007), these elusive constructs may be due in part to the increased engagement in research over the last 15 years. Nevertheless a review of epistemological research reveals that although there are disparate approaches to the conceptualisation they all pursue the same goal of addressing beliefs about knowing and knowledge and their relationship to learning (Rule and Bendixen, 2010). There is a call for clarification and unification of language and terminology so comparable studies can be conducted (Pintrich, 2002; Alexander, 2006). However there is a danger that this unification, whilst reducing the complexity, could be reductionist and therefore close down some avenues of research. The further intricacies of this debate are beyond the scope of this study (see for example Hofer and Pintrich, 1997; 2002; Feucht and Bendixen, 2010; Kuhn et al., 2000 for reviews of the literature presenting further discussion of the theoretical and conceptual debates). To contextualise this study I now present my understanding of these complexities giving reason for the definitions used and a justification of the epistemological framework this study draws on.

3.1.1. Some definitions

Epistemology

There is a general consensus that as a philosophical construct epistemology is defined as the theory of knowledge; that is the nature and justification of human knowledge (Hofer and Pintrich, 1997; Audi, 1998). Epistemological study has expanded from philosophy through to psychology and educational studies; here it alters in the bounds of pedagogy (Alexander and Sinatra, 2007). Alexander (2006) argues this is because there is a difference between the philosophical perspectives of epistemology about the study of what it means to know as opposed to engaging in research about what knowledge is to individuals and how they come to know. Thus Hofer (2004:4) more specifically defines epistemology as ‘the study of beliefs about the origin and acquisition of knowledge’ which is concerned with the ‘nature, limits, methods and justification of knowledge’. It is this sense as an educationalist that I take whilst recognising the underpinning philosophical nature and debate of epistemology, as described in Chapter 2.

Personal epistemological beliefs

It is debated which aspects of an individual’s cognition, beliefs, attitudes or ways of thinking should be included in an individual’s epistemological belief system. By briefly examining the debate of what should be included in such a belief system I hope to create a backdrop for the review of the different theoretical models I later consider.

In terms of the word belief, Hofer and Pintrich (1997:112) draw on Richardson (1996:4) who describes beliefs as ‘psychologically-held understandings, premises or propositions about the world that are thought to be true.’ However, as Pajares (1992:308/311) contends, the construct of belief is messy and by its very nature ‘does not lend itself easily to empirical investigations...[as] belief systems are by their very nature disputable, more inflexible, and less dynamic than knowledge systems.’ Therefore, epistemological beliefs are recognised to be complex and multifaceted (Wood et al., 2002), tacit or explicit, and consequently what we know maybe difficult to recognise or articulate (Buehl and Alexander, 2006; Patrick and Pintrich, 2001; Schraw and Olafson, 2002). Furthermore Maggioni et al. (2006) questions how these beliefs can be accessed and explored if they are difficult to articulate. Buehl and Alexander (2001) attribute this obscurity in part to the notion that the bulk of our epistemological beliefs are much like an iceberg and submerged from view; hence

making it difficult to assess their true nature in addition to constructing a commonly used language.

Hofer and Pintrich (1997) suggest the definition of epistemological beliefs be limited to the nature of knowledge and the process of knowing. In accord Sandoval (2005) strongly argues that whilst beliefs about knowledge may influence one's approach to learning, they are definitely not the same. However, Schommer-Aitkins (2002) considers that whilst epistemology may be captured in its philosophical sense in this definition other related issues are ignored. She argues strongly for inclusion of beliefs about the speed and control of learning and defines epistemological beliefs as being about the nature of knowledge and learning (Schommer-Aitkins, 2008).

Whilst acknowledging the 'conceptual wrangling may be worrisome' Alexander and Sinatra (2007) also feel that the debate will enhance this emergent field. Alexander (2006) commends the move to capture the complexity and dynamism of epistemological beliefs but he also cautions against inflexibility whilst this embryonic field of study is being explored. He warns there needs to be a continued dialogue about the conceptual and linguistic conceptualisation of personal epistemological beliefs, certainly within the dynamic nature and the context of education. Indeed Elby (2009) suggests perhaps we should not converge on a definition a priori but rather rest until further empirical and theoretical development.

The relationship between knowledge and learning is fundamental to this study so whilst recognising the complexity and subtlety of such a term, I use Elby and Hammer's (2002:556) definition of epistemological beliefs in the broader context to mean 'individuals' views about the nature of knowledge and the nature of learning'. I now present a more detailed consideration of the key epistemological models used in current educational studies to frame the context of the study. An overview of three positions are discussed which reflect current perspectives on the nature and development of epistemological beliefs: developmental, cognitive and contextual (Overton, 1984 in Pintrich, 2002). For further overviews of frameworks and systems of beliefs models of personal epistemology see, for example, Hofer and Pintrich (1997; 2002), Hofer (2001) and Feucht and Bendixen (2010). Following this overview I then present a consideration of some of the key aspects of these models relating directly to this study.

3.1.2. Epistemological models

i. Developmental models

A number of frameworks exist which describe personal epistemology as a cognitive construct progressing along a developmental pathway in a specified sequence of ideas about knowledge and knowing. It is widely acknowledged that the work of Perry (1970), who examined Harvard undergraduates' epistemological beliefs, was one of the original investigations into the beliefs about the nature of knowledge. Perry recognised that students' underlying assumptions about knowledge influenced their reasoning and learning. His theory described an individual's progress in the development of these beliefs, their progress through epistemological positions and the role of authority in defining and conveying knowledge. These positions he described as dualism, multiplism, relativism, and commitment through which an individual may move, but may become fixed at any point. In detail:

- *Dualism* describes a set of beliefs that knowledge claims are either true or false, and that this knowledge is given by authority.
- *Multiplism*, acknowledgement of diverse viewpoints recognising that opinion is legitimate and not all knowledge is certain.
- *Relativism* describes a shift in thinking; individuals consider that knowledge is actively and personally constructed and diversity of opinion is legitimate within given contexts, recognising some views are better than others.
- *Commitment*, the final position, highlights the contextualisation of epistemology where flexibility and refinement of the knowledge claim is a component.

From this work Perry concluded that students began college with an objectified view of knowledge where beliefs in simple and certain knowledge are handed down by authority but, by the end of college, changed to the belief that knowledge is tentative and complex and is derived from reason and observation (Schommer-Aitkins, 2002). Perry hypothesized, without conducting research into his idea, that student points of view about the nature of knowledge are related to their manner of studying (Hofer and Pintrich, 1997). Although his work was criticised for limited student sample and gender bias it nevertheless generated much research activity into epistemological beliefs of students. Perry's study has been elaborated by others who have developed further schemes with differing foci.

Belenky et al. (1986) built on Perry's work using a female sample drawn from a more diverse background. They developed five 'ways of knowing' similar to Perry's positions: silence, received knowing, subjective knowledge, procedural knowledge and constructed knowledge (Table 3.1). The stages were also deemed progressive, drawing in more detail on the perspective of the self as a knower. Baxter Magolda (1992) developed the Epistemological Reflection Model based on a longitudinal study of both male and females, noting gender-related patterns within the stages. She identified four epistemological positions (Table 3.1) comparable to that described by Perry (1970); the stages being: absolute, transitional, independent and contextual.

Perry, 1970	Belenky et al., 1986	Baxter Magolda, 1992	King and Kitchener, 1994	Brownlee et al., 2001	Kuhn and Weinstock, 2002
Dualism	Silence	Absolute	Pre-reflective thinking	Received absolute truths (REC)	Realist
	Received				Absolutism/ Objectivism
Multipism	Subjective	Transitional	Quasi-reflective thinking	Subjective reasoned truths and Received absolute truths (SUBREC)	Multipism/ Subjectivism
Relativism	Procedural	Independent			
Commitment	Constructed	Contextual	Reflective thinking	Construct reasoned truths (CON)	Evaluativism

Table 3.1 Comparable epistemological positions

King and Kitchener (1994) developed the reflective judgement model with a similar developmental framework but with a focus on the cognitive process of knowing and reasoning. The model has seven stages delineating the development of reflective thinking categorised into three levels: pre-reflective, quasi-reflective, and reflective. Kuhn (1991) also focused on epistemological assumptions that influence thinking and reasoning through the solving of ill-structured problems. Initially Kuhn identified three stages of argumentative reasoning but more recently added a fourth (Kuhn and Weinstock, 2002). They used realist, absolutist, multiplicity and evaluativist to describe levels of epistemological understanding defined by the coordination of the subjective and objective dimensions of knowing. Brownlee et al. (2001) also divided epistemological beliefs into four main categories but suggested that rather than stage-like unidimensional characteristics individuals might have a different mix of belief depending on context and domain. This notion of mixed beliefs is not accounted for in the other models depicted in the table.

Hofer (2001:359) summarises these unidimensional models as sharing 'interactionist, constructivist assumptions [which] sketch similar trajectories of development'. The developmental path begins with an objective, dualistic view of knowledge moving through a subjective stance which then develops into the ability to recognise the merits and values of other points of view to, finally, the justification of knowing and knowledge being actively constructed by the knower and the belief that knowledge and truth are evolving (Hofer, 2001). These developmental models are rejected by others as a discussion of epistemological development is limited to a single dimension (Pintrich, 2002). However, it is important to recognise those models that subscribe to unidimensional belief systems do not completely reject the different aspects, rather they reject the assumption that epistemological thinking can be broken down into coherent independent parts (Pintrich, 2002).

ii. Cognitive models

Epistemological belief system

The unidimensional view of epistemological beliefs was challenged by Schommer (1990; 1998; Schommer et al., 1992) who suggested that personal epistemology, rather than being unidimensional and progressing through a fixed progression of stages or related to maturity, is a belief system and is composed of several relatively independent dimensions. Schommer (1990:498) contends that 'beliefs about the

nature of knowledge are far too complex to be captured in a single dimension'. Drawing on the work of Perry, Schommer reconceptualised personal epistemology and proposed a multidimensional view of epistemological beliefs as a system of more or less independent beliefs, 'by system, it is meant that there is more than one belief to consider, and by more or less independent, it is meant the learner could be sophisticated in some beliefs but not necessarily sophisticated in other beliefs' (Schommer, 1993:407). Individuals may hold both relativistic and dualistic views about the nature of knowledge depending on the context, and these beliefs may not necessarily develop in synchrony. Schommer's study (1990) controversially expanded to include beliefs about learning; this aspect will be considered in more detail later. Schommer proposed five dimensions where each dimension can be viewed from a naïve perspective to a more sophisticated stance:

1. Fixed, innate ability to learn - the ability to learn is innate and fixed rather than acquired and incremental;
2. Quick learning - learning is quick or not at all rather than gradual;
3. Simple knowledge - knowledge is simple rather than complex and interrelated;
4. Certain knowledge - knowledge is certain rather than tentative;
5. Omniscient authority - knowledge is handed down by authority rather than derived from reason.

Schommer believed the simultaneous development of these beliefs could not be assumed, so to have a more complete understanding of personal epistemology she considered each belief should be examined separately. It is important to bear in mind that it cannot be assumed that epistemological beliefs develop in synchrony, especially when individuals are changing their minds (Duell and Schommer-Aitkins, 2001). This led Schommer (1990; 1998) to develop the Epistemological Beliefs Questionnaire (EBQ), a 63-item instrument where repeated factor analyses on different populations yielded the first four factors out of the original five dimensions proposed. There have been several studies that have used and developed Schommer's framework in relation to aspects of academic achievement and specific subject domains (Bendixen et al., 1994; Braten and Stromso, 2005; Chan and Elliott, 2004; Clarebout et al., 2001; Paulsen and Wells, 1998; Qian and Alvermann, 1995; 2000; Schraw et al., 2002). Schraw et al. (2002) modelled their Epistemic Beliefs Inventory (EBI) on Schommer's EBQ by developing a shorter 28 question instrument that measured the same 5 dimensions.

Epistemological theories

Hofer and Pintrich (1997) challenged both the developmentalists view and those of Schommer, instead proposing that individual beliefs about knowledge and knowing are organised into a structure of interconnected and coherent personal theories. This theory of interconnected structures and integration of individual beliefs retains the multidimensionality of the epistemological belief system. Hofer and Pintrich suggested four independent dimensions of epistemic beliefs grouped as two subsets: the *nature of knowledge* and the *nature of knowing*. The *nature of knowledge* incorporates: (1) simplicity of knowledge, which describes the connectedness of knowledge, and (2) certainty of knowledge, which describes the complexity and stability of knowledge; and the *nature of knowing*, (3) the source of knowledge, and (4) the justification of knowledge. Notably, the beliefs about learning or nature of ability are not included in their definition. Buehl (2008) and Hofer (2000) found support for these four dimensions in a number of empirical studies. However, Buehl (2008) also encompasses beliefs about ability and speed of knowledge acquisition as a contributing factor to the process and nature of knowing. Buehl relates this to Schommer's (1990) and Schraw et al. (2002) innate/fixed ability factor.

iii. Contextual models

Epistemological resources

Hammer and Elby (2002) reject the notion that students hold epistemological beliefs either as theories that can be probed by direct questions or as traits that are revealed by behaviours. Rather, they suggest, epistemological knowledge is made up of a range of resources, dependent on the situation and context of individuals. Accordingly the activation, the number and nature of these epistemological resources is dependent on the context. Hammer and Elby (2002) proposed a framework of, initially, four general categories: nature and sources of knowledge, epistemological activities, epistemological forms, and epistemological stances; and latterly added epistemological framing (Elby and Hammer, 2010).

In line with my worldview is the cognitive model of epistemological beliefs which sees a multidimensional view of epistemological beliefs as a system of more or less independent beliefs, including aspects of learning. However, it is apparent that there is correspondence between all these models presented above. Hofer (2001:377) and others (Bendixen and Rule, 2004; Greene et al., 2010) suggests that elements of all

may be necessary to best understand students' personal epistemology and has therefore called for a move to an 'integration of ideas from multiple models'. Therefore, whilst there is specific use of Schraw et al. (2002) Epistemological Beliefs Inventory within this study I do not believe that any conceptual model can completely capture the features of such a dynamic system. In this study I remain cognisant of aspects of other models in my approach.

3.2. Epistemological beliefs and relationship to learning and beliefs about intelligence.

Since Schommer (1994) suggested that epistemological beliefs may either help or hinder learning there has been a growing body of evidence that suggests epistemological beliefs play a critical role in the learning process (Billet, 2009; Brownlee et al., 2001; Buehl, 2008; Braten and Stromso, 2005; Buehl and Alexander, 2001; 2005; Dahl et al., 2005; Elby and Hammer, 2010; Greene, 2007; Duell and Schommer-Aitkins, 2001; Hammer, 2003; Hofer and Pintrich, 1997; Hofer 2001; 2002; Kardash and Scholes, 1996; Muis and Franco, 2010; Pintrich, 2002; Sandoval, 2009; Schraw et al., 2002; Schraw and Sinatra, 2004; Schommer-Aitkins et al., 2010; Schommer-Aitkins and Easter, 2006; Tolhurst 2007; Wood and Kardash, 2002). Lucas and Tann (2006:8) put this succinctly and claim 'a student's way of knowing will act as a lens through which she or he views the world' so affecting the way in which students learn and make judgments. Different models offer varied understanding of the links between beliefs about knowledge and knowing and other constructs such as speed of learning (Schommer 1990; Hammer and Elby, 2002; Schraw et al., 2002) or nature of ability (Dweck, 1999; Schommer, 1990; Schraw et al., 2002).

Hofer and Pintrich (1997) and Sandoval (2005) acknowledge there may be a correlation between beliefs about learning and beliefs about knowledge; however they do not recognise that these beliefs can be equated. Whilst Sandoval (2005) argues strongly that epistemological beliefs are not reflected in beliefs about learning, Hofer (2001) describes beliefs about knowledge and knowing as part of a process of learning and critical components of understanding about student learning, but challenges the notion that nature of ability and speed of learning should be considered a construct of epistemological beliefs. Although they concede that beliefs about ability can have motivational power Hofer and Pintrich (1997) contend that these beliefs are part of one's implicit theory of intelligence. Also Pintrich (2002) argues that the links between beliefs about intelligence and beliefs about learning can

be rationalised. If one believes that the ability to learn or intelligence is fixed in this will influence one's beliefs about how easy or quick learning is. Therefore, beliefs about intelligence may well constrain the range of beliefs about learning (Pintrich, 2002). The epistemological beliefs, according to Hofer and Pintrich (1997), function as implicit theories which give rise to certain goals for learning which can then affect academic performance. Pintrich (2002) recognises there is a high consensus that personal epistemology is linked to learning and other academic outcomes but suggests there is a need to understand the how and why of these links; it is the nature of these links that are in contention.

Conversely some (e.g. DeBacker and Crowson, 2006; Elby and Hammer, 2010; Schommer-Aitkins, 2002; 2004) argue that the relationship between beliefs about learning and beliefs about knowledge and knowing have been established and therefore should be included in the definition of personal epistemologies. Schommer (1994:318) maintains that 'epistemological beliefs are critical to the learning process' and her research demonstrates numerous links between epistemological beliefs, academic cognition and learning. For example, if students believed learning should occur quickly they were less likely to perform well and attain higher grades (Schommer et al., 1997). In continued research Schommer-Aitkins and Easter (2006) develop their understanding of these links suggesting each belief or combination of beliefs may play a unique role in learning. Maggioni et al. (2006) goes further and considers there is a reciprocal relationship between epistemological beliefs and learning. Likewise, from the premise that conceptions of knowledge and learning are overlapping ideas Entwistle (2007) suggests that a student's conception, dependent on context and circumstances, is created from ways of thinking about aspects of knowledge and processes of learning that influence both levels of understanding reached and approaches to study. Entwistle (2007) suggests the deep, holistic approach has parallels with relativistic reasoning with connections being made between ideas through interplay of inductive and detracted reasoning, bringing with it a metacognitive and sophisticated awareness of learning. Surface or atomistic approaches to learning we can therefore relate to a naïve stance associated with the idea of learning is about the acquisition of facts and information that may be seen as discrete elements that have few connections.

Schommer-Aitkins (2004) draws on Dweck's work which supports the belief that learning to learn and beliefs about intelligence are critical to the learning process. Dweck (2000) posits two frameworks for understanding intelligence and achievement:

that of the belief that intelligence is fixed, entity theory, or intelligence can grow or is malleable, incremental theory. She describes these as mindsets that influence how individuals conceive their ability to learn. With the fixed belief of intelligence Dweck argues that people think there is not much they can do to increase their intelligence. They believe their performance reflects their ability, and so, because they are afraid to make mistakes due to fear of failure and the reflection on their self-worth, they avoid challenging situations. Dweck claims that the goal performance mentality is about doing it right, and not succeeding hurts. People with this perception need easy, low-effort successes as challenges threaten their self-esteem. Bendixen et al. (1994) describe students who view ability as innate and fixed as less inclined to pursue challenging and intellectual tasks and so be less inclined to develop and use advanced reasoning skills. In line with this theory Perkins and Grotzer (1997:1125) warn that 'tacit beliefs in the limitations of one's intelligence become self-fulfilling prophecy'. Dweck (2000:3) describes how we encourage vulnerabilities in our students when we work and teach within this system, by an over concern 'with looking smart, a distaste for challenge, and a decreased ability to cope with set backs'. Alternatively in the 'incremental theory', intelligence is portrayed as something that can be increased through one's efforts (Dweck, 2000:3); therefore a belief that intelligence can increase through learning and can be taught to some extent (Perkins and Crotzer, 1997). Dweck claims that people with these beliefs are motivated by learning goals which are more to do with understanding for its own sake and so do not view failures or difficulty as a reflection of their intelligence. Sternberg (2000) also considers a main factor in people achieving expertise is not fixed prior ability, but purposeful engagement in the context of the developing-expertise model. Claxton (2005:24), who concurs with the belief that intelligence can be increased and improved, also opposes the notion that it is a 'fixed-sized pot of cognitive resource'. This concept of a growth mindset allows people to value what they are doing regardless of outcome. The experience of not succeeding may not harm self-esteem so much because it can be understood as all part of the process of coming to understand.

Using Dweck's framework DeBacker and Crowson (2006) propose that achievement goals and epistemological beliefs have a direct effect on cognitive engagement. If, for example, an individual has a belief about omniscient authority this could lead to a performance-approach goal. Alternatively a mastery goal would be achieved if the individual believed that knowledge was constructed rather than obtained from authorities. Less cognitive effort is likely from those who believe that knowledge is

simple however those with a sophisticated view of the structure of knowledge, that is the tentative nature of knowledge, will focus on personal mastery. Wheeler (2007) draws on research that positively correlates those with a performance goal orientation with the use of surface strategies and those with learning goals who are associated with deep strategy use. These and other studies demonstrate a strong theoretical and empirical correlation between beliefs about knowledge and knowing and beliefs about learning.

Elby (2009) responds to three arguments from Sandoval (2005) and Hofer and Pintrich (1997) for the exclusion of beliefs about learning in personal epistemologies. Firstly, according to Sandoval (2005) by including beliefs about learning in personal epistemology we risk conflating epistemological beliefs with other motives and beliefs. Elby (2009) however argues that this exclusion does not necessarily disentangle student epistemologies from the other beliefs and motives. Rather the narrowing of what constitutes personal epistemology may further hinder the complexities of these beliefs. Secondly, the argument raised by Hofer and Pintrich (1997) that current epistemological studies should align themselves to the narrow established definitions of epistemology is refuted by Elby who considers this definition pre-emptive and not based on empirical or theoretical grounds for doing so. Indeed this narrow definition could hinder attempts to explore the substance of cognitive structure of students' epistemologies (Elby, 2009). Lastly, Elby addresses the issue of clarity presented by Hofer and Pintrich (1997) and Sandoval (2005) in defence of their narrow definition of personal epistemology. Elby clearly recognises the need for clarity of definition because of the coherence it would bring to the research field but continues to argue the restriction of definition at this point in our understanding is not productive to a genuine understanding of this construct. However, whilst recognising the views about knowledge are linked with views about learning, Elby (2009) suggests that until further empirical and theoretical progress gives further direction we should not 'etch' the nature of learning irreversibly into the definition of personal epistemology.

In agreement Schommer-Aitkins et al. (2010) gives three reasons for the inclusion of beliefs about learning and ability: learning beliefs develop before knowledge beliefs (Schommer-Aitkins et al., 2000) and students' beliefs about the source of knowledge are revealed by their beliefs about learning (Schommer-Aitkins, 2004); learning beliefs can facilitate or inhibit the development of knowledge beliefs; and, beliefs about learning and knowledge together often predict academic performance. A key point from Schommer-Aitkins (2008) is that deeper understanding of learners is more

likely if both types of beliefs are studied simultaneously. Schommer-Aitkins et al. (2010) also acknowledges that to help with clarification and lessen confusion it may be helpful to consider the epistemological belief system as being composed of two subsets of beliefs, knowledge beliefs (purely epistemological) and learning beliefs (epistemologically related).

I take heed of Schommer-Aitkins et al. (2010:50) warning: 'Do not get lost in the fog of lofty language. Do not let the elegant sounds of pseudo-philosophical hyperbole let your mind get clouded as to basic goals of research, rather keep in mind the goal of your research.' With this in mind I take the view that although beliefs about learning and beliefs about knowledge are not the same they are, however, linked and therefore come together in people's personal epistemological belief system. I am also mindful of the question that whilst these interconnected constructions can be theoretically separated, in practice this may not be a necessary or purposeful way to extend our understanding of pedagogy. As Elby and Hammer (2010) suggest there are practical reasons for including views of learning alongside views about knowledge in knowing in our definition of personal epistemology.

3.3. A challenge to the notion that sophisticated beliefs are best

Reasoned judgements, analysis, argument and higher-order critical thinking are important educational goals (Kuhn, 2000; Hofer, 2001; QAA, 2007) therefore the notion that it is desirable to move from naïve views, underpinned by a realist worldview where a representation of reality can be known, to sophisticated views centred on the relativist worldview, sometimes to its most radical aspect, repeated throughout the literature (e.g. Brownlee, 2001; Olsen et al., 2011) is understandable. Students with naïve beliefs who consider knowledge is certain and simple are likely to rely on authority to make available answers and information whereas those with sophisticated beliefs are more likely to challenge different opinions and persevere towards their goals (Brownlee et al., 2001; Buehl and Alexander, 2001; Hofer, 2001; Hofer, 2002; Schraw, 2001). This trajectory of development is described by the different epistemological models as a general overarching pattern of development of personal epistemology (Hofer, 2001; Kuhn et al., 2000; Rule and Bendixen, 2010).

Elby and Hammer (2001) and Bromme et al. (2010) challenge this view that sophisticated is best and suggest it is an oversimplification. Elby and Hammer

present the argument from the literature that the view of naïve realism (that is scientific knowledge is discovered through careful observation) in philosophical terms, is untenable, alongside the argument that naïve relativism (scientific knowledge is a social construction unconstrained by nature) is also untenable. They caution that we must challenge the notion of blanket generalisations about the sophistication of epistemological beliefs.

Elby and Hammer (2001) propose that naïve realism in certain circumstances may be more productive if it 'generates behaviour, attitudes and habits that lead to progress' (p.561). For example they argue that it is not necessarily more naïve to accept knowledge from authority, their issue is with the assumption that it is unproductive to believe that authority can provide understanding. They suggest that epistemological sophistication includes the ability to distinguish established and controversial ideas. According to Elby and Hammer (2001:565) 'a blanket distrust of authority is no more sophisticated than a blanket trust' and that it is the context of knowledge application and intended use of knowledge that should affect our attitude towards the certainty of that knowledge (Bromme et al., 2010).

It is considered that maturity and life experience, including educational experience, is the basis for transition to a sophisticated level of understanding, however Hofer (2001) and Kuhn (2000) consider that increasing age and education are not sufficient to affect the transition. Indeed I have witnessed both naïve and sophisticated epistemological positions in the classrooms of primary children and students in higher education. Children, aged 10, have shown a more sophisticated stance through debating problems, acknowledging and engaging with opinions of others, and making judgements through sound critical evaluation whilst, conversely, students engaged on a teacher training PGCE readily assert that reality is directly knowable and knowledge is certain, so demonstrating a naïve position (Osborne, 2007). The presentation of similar individual epistemological beliefs at significantly different ages is recognised in other studies (Hofer, 2008). Kuhn (2000) proposes this may be due to the intellectual climate prevalent in Western culture where reasoned argument, as the heart of a sophisticated epistemology, is inhibited by the values of social tolerance and acceptance, where personal opinion seems to be valued more than reasoned argument. Whilst Hofer and Pintrich (1997) propose students who attend further or higher education are more likely to show sophisticated epistemological thinking than those who do not attend there are other studies which suggest that many graduates do not develop sophisticated epistemological beliefs (Baxter Magolda, 1992; Hofer

and Pintrich, 1997; King and Kitchener, 1994; Perry, 1970). However they do not take into account contextual factors, distinctions in different domains or how particular kinds of educational experiences might affect epistemological development (Smith and Wenk, 2006). This has led to consideration of how particular domains affect epistemological views or how these beliefs are manifested within these domains. Bromme et al. add to this argument as they highlight a nonlinear relationship from naïve beliefs to sophisticated beliefs. They conceive sophisticated epistemological beliefs as 'those beliefs which allow for context-sensitive judgements about knowledge claims' (Bromme et al., 2010:432) therefore suggesting sophisticatedness relates to the flexibility in specific domains and contexts. This relates to the developed contextual understanding required in conceptual change.

3.4. Epistemological beliefs and the link to conceptual change

Conceptual change can be broadly defined as learning that facilitates the change of an existing concept or idea (Deissler, 2007). Whilst conceptual change has its roots in science and mathematics in an attempt to understand the re-conceptualisation of knowledge central to this discussion is learners' awareness of their own beliefs. (Deissler, 2007; Hofer and Pintrich, 1997; Pintrich et al., 1993; Vosniadou, 2007b). Epistemological beliefs are fundamental to the conceptual change process having a direct and indirect influence on learning (Alexander and Sinatra, 2007; Murphy, 2003; 2007; Vosniadou, 2007b; 2007c). Vosniadou (2007c) describes the direct influence as preventing individuals with naïve beliefs being open to new information that questions their assumptions, whereas those who have sophisticated beliefs are willing to be more open to challenge and new theories. Likewise Mason and Gava (2007) demonstrate those with more sophisticated epistemological beliefs generate more conceptual change than those who believe knowledge is simple and certain. They also found that metaconceptual awareness was enhanced by sophisticated beliefs. There is also an indirect influence on goals, study strategies and self-regulation which Vosniadou proposes links to beliefs about learning and intelligence. Using Schommer's questionnaire, Qian and Alvermann (1995; 2000) found the epistemological beliefs predicted conceptual change. Students with naïve belief about knowledge and learning were less likely to revise their conceptions. Moreover beliefs in simple and certain knowledge and quick learning were the most important predictors of knowledge restructuring. Mason (2003) goes further and argues that personal epistemologies facilitate or constrain students' intentional conceptual change thus determining goal orientations.

Vosniadou (2007b) argues that it is not about replacing 'incorrect' conceptions with 'correct' conceptions but an understanding when different conceptions are appropriate in the context of use. This suggests a developed or sophisticated epistemological stance coupled with a high level of cognitive understanding in the conceptual domain. In the affective domain this may be a reflection of one's own values and assumptions. Recognising this broader perspective conceptual change requires the ability to take 'multiple perspectives, examine different points of view and understand how they relate to different context of the applicability' (Vosniadou, 2007b:9).

Not only can epistemological beliefs influence conceptual change but they can also go through the same changes. Meyer and Land (2006:4) present a model for conceptual change through the notion of 'threshold concept' which they describe 'as akin to a portal, opening up a new and previously inaccessible way of thinking about something'. This engagement with a threshold concept may enable transformation of a subject or a worldview, such as epistemological beliefs, either suddenly or over a period of time and will therefore enable progression in learning. Meyer and Land (2006:7) describe threshold concepts as:

- Transformative with a significant shift in perception that may be just a conceptual shift, or a conceptual shift that involves an affective component with a shift in values, feelings or attitude and thus relating to Mezirow's (1978) perspective transformation as new understandings are assimilated into who we are.
- Irreversible as an individual's landscape of understanding is radically transformed. This transformed state may feel like a loss or the previous state may be hard to understand.
- Integrative so exposing the interrelatedness of the different aspects across the threshold possibly taking the individual from the novice to the expert perspective.
- Bounded where there are new thresholds into new conceptual areas.
- Troublesome knowledge which is counter-intuitive.

Transformation can entail a shift in the learners identity leaving them in an in between place of previous less sophisticated understandings and an appreciation of what their next steps might be: a position of liminality. An understanding of the contribution of the active individual mind to change is crucial (Vosniadou, 2007b). In terms of what

it is to know learners will have conceptions of the source and certainty of this knowledge linked to their inherent belief structure helping us to make sense of our personal and social worlds thus providing guidelines for action (Murphy, 2007). However, it is also important to remember that conceptual and epistemological change is not always an isolated and individual process but is affected by a complex socio-cultural world in which we reside and, according to Vosniadou (2007b), we should take account of the situation, cultural and educational contexts. The importance of social interaction in conceptual change cannot be underestimated as this may provide motivation to consider alternative points of view but stimulating reconsideration of one's own perspective (Sinatra, 2003; Slavin, 1999). As Sinatra (2008) explains in a social environment students may be more willing to consider alternative points of view when engaging with their peers, and may even find their peers views more compelling than their teachers. However, Mason (2007) also draws attention to the issue of transferability where knowledge being bound by its context is not easily transferred. Whilst it is recognised that conceptual change is influenced by motivation, social and contextual aspects Sinatra (2008) suggests that we are still a long way from understanding what these affects are. The influence of context is paramount and is now considered in relation to epistemological beliefs.

3.5 Context of epistemological beliefs

Schommer-Aitkins (2002) contends that we need to address the multiplicity or singularity of beliefs, the independence and dependence of beliefs, and the domain specificity and generality of beliefs for a more precise definition of an epistemological belief system, otherwise, as Hofer (2006) suggests, such divisions ignore the dynamic interplay of lived experience. The messiness of the individual belief structure (Pajares, 1996) is reflected in the 'complex, multidimensional, interactive, sociocultural, contextual and developmental nature of student beliefs' (Buehl and Alexander, 2006:39). The messiness of the relationship between epistemological beliefs and beliefs about learning has already been debated in section 3.2 here it is argued if, and how, epistemological beliefs may vary depending on contexts or domains (Alexander, 2006; Buehl and Alexander, 2001, 2006; Buehl et al., 2002; Elby and Hammer, 2001; Hammer and Elby, 2002; Hofer, 2000; 2006; Muis et al., 2006; Pintrich, 2002; Schommer and Walker, 1995; Schraw 2001; Vosniadou, 2007a).

Some consider that there are domain-specific epistemological beliefs which differ from general epistemological beliefs depending on the discipline studied (Alexander,

2006; Hofer, 2000; Paulsen and Wells, 1998; Vosniadou, 2007a). According to Muis et al. (2006), general epistemological beliefs, knowledge that is informally acquired, are separate from academic epistemological beliefs, knowledge that is formally acquired. Buehl and Alexander (2001) draw on studies that show students demonstrate different epistemological beliefs depending on the academic area. Furthermore they suggest that different subjects either promote different epistemological stances or indeed attract students with specific educational stances. Lucas and Tann (2006) and Olafson and Schraw (2006) also maintain that there are epistemological beliefs common across domains but also agree there is a domain-specific element and that context has an influence.

This debate is understandable and to be expected considering academic, or domain, specific practices and skills that are prevalent in the classroom already. However, Limon (2006) and Hofer (2006) both question whether the domain generality-specificity debate presents a 'false dichotomy' as knowledge can neither be wholly one nor the other. Schommer-Aitkins (2002) is also careful to point out that epistemological beliefs are too complex to be seen as completely independent or only domain general and latterly accepts that 'the existence of general and domain specific epistemological beliefs is open to question' (Schommer-Aitkins et al., 2005:292). Indeed Hofer (2006) suggests there is now acknowledgement of both domain specificity and domain generality working together with a tentative suggestion from Buehl and Alexander (2006) that domain-general beliefs influence domain-specific beliefs.

I use Buehl and Alexander's (2006) belief that beliefs about knowledge are components of an intricate nested epistemological beliefs system, in accordance with Schommer (1990), sharing aspects that are multidimensional, multilayered, contextual, developmental, interactional and dependent on experience (Figure 3.1). They demonstrate a relationship between the knowledge acquired and experiences that shape our epistemological beliefs echoing a reciprocal relationship between structure and agency. However, whilst there is a clear influence these characteristics and beliefs do not reflect each other exactly and they suggest it is possible to have contrasting espoused beliefs depending on the context or situation, where 'knowledge is embedded in and continually shaped by the sociocultural context'. Buehl and Alexander (2006) argue beliefs about knowledge are nested among other subsystems of beliefs within a sociocultural context (Figure 3.1). They propose that these beliefs can be both a general construct as well as residing in specific domains. Interaction,

they suggest, occurs at the multidimensional level and the domain-general and domain-specific levels. Moreover, they suggest as individuals are exposed to time and experience they modify their beliefs from naive to sophisticated beliefs through their life course depending on the context of the situation and developing confidence in the new situation. This, as has already been alluded to, is not a simple linear process and may help explain the non-linear relationship between knowledge and learning (Mason and Bromme, 2010).

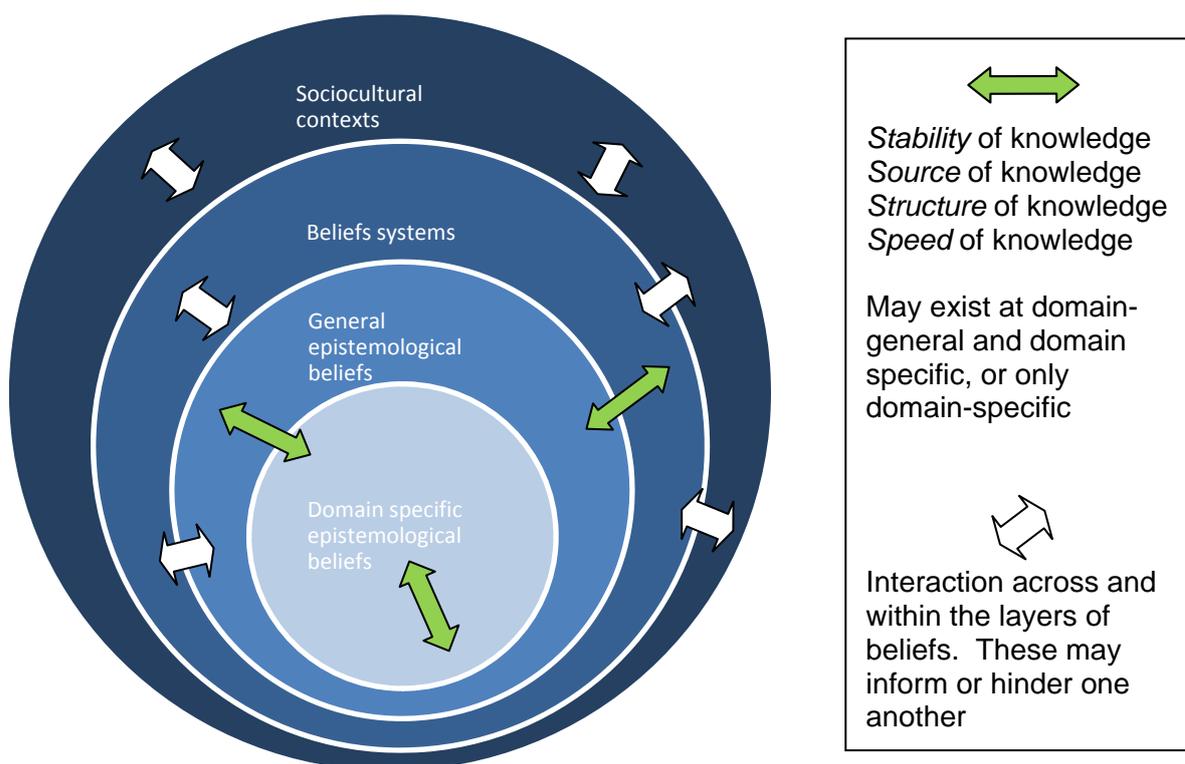


Figure 3.1: Nested epistemological belief system (Buehl and Alexander, 2006)

This intricate system is also recognised by Schommer-Aitkins (2004) who, drawing on Bronfenbrenner’s (1979) theory of human development, suggests that there are multiple levels of environmental and cognitive variables in the ecological systems theory. Although representing a different concept I consider that Buehl and Alexander’s belief system may be juxtaposed with Bronfenbrenner’s systems theory. The transition in each system from the specific, or the individual, through the wider layers to the sociocultural context, or Bronfenbrenner’s macro system, is held together by the interactive and influential nature of each layer dependent on sociocultural or socio-historical context and conditions. Therefore, drawing on the

debate about domain-general and domain-specific knowledge it is apparent that knowledge and beliefs about knowledge may be shaped by the social, historical and cultural context. Indeed Kinlaw and Kurtz-Costes (2003:159) suggest there should be a greater exploration of biological and environmental factors which might influence those beliefs. Bendixen and Feucht (2010) emphasise the important components of the epistemological climate within which students operate including classroom culture and materials, the curriculum, family and peers. Reflecting Hofer's (2006) notion of dynamic interplay personal epistemologies clearly do not operate within a vacuum (Feucht, 2010; Schommer-Aitkins et al., 2000) with the epistemological environment implicit in the context of learning (Mason, 2003). To understand further the relationship with learning explored in section 3.2 it is important to understand the situational and contextual nature and beliefs of knowledge where the influence of teacher, cohort, group, and environment can be significant.

Specifically a student's epistemological thinking may be influenced by the environment and underlying concepts in a given domain. Windschitl and Andre (1998 in Mason, 2003) found a more structured environment is more suited to students who believe in certain and simple knowledge as it allows them to proceed step by step, whereas students who believe in complex and uncertain knowledge excelled in the innovative environment which allowed at construction of their knowledge. As this conceptual understanding changes through mastery of the domain it is likely that the epistemological thinking will also change (Sandoval, 2005; Smith and Wenk, 2006) therefore demonstrating a contextually mediated association between conceptual change and epistemological beliefs.

Whether knowledge is either a sociocultural construction or merely influenced by the context is debated (Buehl and Alexander, 2006; Hammer and Elby, 2002; Lave and Wenger, 1991). Buehl and Alexander (2006), for example, maintain beliefs about knowledge are shaped by the contextual and situational nature of students' conceptions of knowledge. However, Hammer and Elby (2002) contend that students' views of knowledge are situated specifically within particular contexts depending on the activation of epistemological resources. Likewise Leach and Lewis (2003) argue that students throughout the education system draw upon and activate different epistemological beliefs in different contexts. Context can bring to the fore the tacit knowledge or introduce explicit knowledge which in turn effects the context.

I consider there is a level of reciprocity between the two where the structure of the context influences human behaviour, at the same time humans are able to change the social structures they inhabit. The dualist notion of the individual versus society is challenged in the literature and reflected in the works of Giddens' structuration theory and in Bourdieu's notion of habitus (Layder, 2006). Whilst their theoretical frameworks are very different from each other they appear united by this shared interest in, and consequences of, the intertwined nature of individuals and society where people live in and through their social circumstances. This is reflected by Pintrich (2002:403) who claims that development is a function of both person and the context, and Smith and Wenk (2006) who believe epistemological beliefs develop through interaction with each other and in response to real-world situations. Layder (2006) describes psychobiography that we each possess and have developed from dispositions of attitudes and behaviours built up over time. This psychobiography he considers as the underlying mechanism that allows the agency of change as a response and reaction to social circumstances, not simply reflections of the social conditions we find ourselves in, thus relating to the critical realist perspective which underpins this study.

To explore these theories in any depth is beyond the remit of this study but the notion that structure and agency are inextricably linked as we create and are created by society, I suggest, is implicit to the development of epistemological beliefs as represented in Figure 3.2. This diagram symbolises the interface between the individual, the context and Buehl and Alexander's (2006) nested epistemological beliefs system. This supposition relates to my overarching belief in the interconnectedness of reality in which I find it hard to reconcile the dualism of structure versus agency, society versus individual, and macro versus micro.

As has been argued, epistemological beliefs are fundamental to the learning process therefore the interactions between the individual, the context and epistemological beliefs are critical to the conceptions and processes of learning. Ultimately learning is therefore both a product of, and a creative force in, this system. This relationship is seen in the active reflective process of learning whereby new experience is related to existing meaning to shape future action (Abbott, 1994) in a context that is influenced by our culture and society. Consequently central to the effectiveness of the learning process, as has been presented in 3.2, is the need to better understand the relationship with epistemological beliefs.

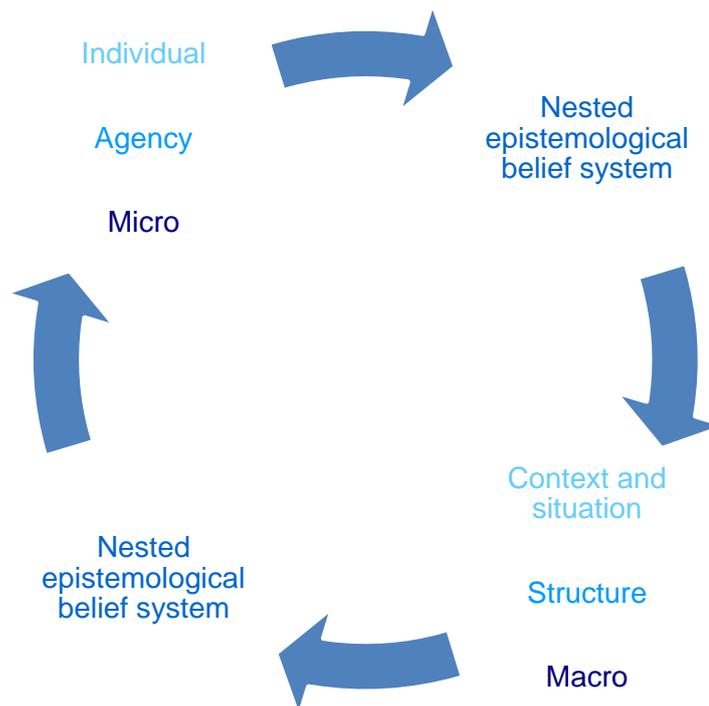


Figure 3.2 The reciprocal interaction between the individual, context and epistemological beliefs.

Society and culture are dynamic systems therefore we can assume the social or cultural character of knowledge is also dynamic. It therefore makes sense that changes to the context can have an immediate influence on knowledge acquisition and activation (Andersen et al., 2000 in Buehl and Alexander, 2006) and thus the process of learning. As concluded in section 3.2 the relationship between epistemological beliefs and learning processes is not in dispute (Buehl and Alexander, 2006; Hofer and Sinatra, 2010; Mason and Bromme, 2010) rather it is the nature of this relationship and the influence of context on the nature and role of this relationship that continues to be explored (Greene et al. 2008; Mason and Bromme, 2010). Hofer and Sinatra (2010:119) posit that learners are best served through the development of ‘rich, flexible, generative beliefs’ as well as ‘rich, flexible, generative knowledge’. Hofer and Sinatra (2010) suggest facilitating such flexibility for learners may enable the adaptation of their beliefs in new contexts of learning. This has implications for the new context of higher education for many learners.

3.6 Implications for higher education

The relationship between epistemological beliefs and how individuals learn applies to tertiary settings (Brownlee, 2001). Of note it is rare to find adults beginning higher education with a sophisticated, critically aware stance regarding knowledge (Hofer, 2001; King and Kitchener, 1994; Kuhn, 1991). However, Hofer (2006:74) observes in the post-modern world students 'speak the language of social construction' and having 'years of exposure to ideas about social construction of knowledge' they are therefore less likely to arrive in higher education as dualists. Conversely a Foundation degree student's journey into higher education is diverse and circuitous they may lack exposure to the language of social constructivism and may not have developed a related belief to knowledge.

A search of the literature did not reveal any studies that considered Foundation degree students epistemological beliefs in any discipline. Therefore, I have drawn from studies centred on other disciplines in undergraduate and postgraduate education. For example, Baxter Magolda (1994 in Brownlee, 2004) suggests contextual knowing is not common in undergraduates, but becomes increasingly more common in postgraduate students. However, Schommer (1998) has shown although graduates beginning a one year teacher education course should typically be able to operate within an epistemologically sophisticated understanding of their discipline, they can be naïve in terms of their metacognitive awareness. Indeed, although students' epistemological beliefs are modified when engaged in higher education studying at university has less effect than is often assumed or claimed (Hofer and Pintrich, 1997), since epistemological beliefs are deeply ingrained and will influence the learning. This is echoed by Brownlee et al. (2001) who observe even if a suitable environment is created it is difficult to change students' epistemological beliefs, reiterating the view that not only should students' epistemological beliefs be considered but, as has been shown earlier, their learning environment needs to be taken into account.

Schommer's research (e.g. 1990, 1993) found if students tended to focus on factual understanding they viewed knowledge as dualistic, however if students had a more relativist view of knowledge their understanding would be based on constructing and developing meaning through application. Those with relativistic beliefs were also more likely to be more reflective in their thinking rather than focused on acquiring content. This was equated with a progression from naïve to sophisticated way of thinking. This final stage where 'knowledge is actively constructed by the knower,

knowledge and truth are evolving, and knowing is coordinated with justification' (Hofer, 2001) should therefore be a belief structure developed as students progress through higher education. However, Entwistle (2007) describes the possible initial dependence on rote learning gives way to meaningful learning through experience and circumstance as individuals recognise that other kinds of learning are more appropriate for tasks in higher education. Using the principle of multidimensional epistemological development Schommer (1994) explains that someone with a dominant sophisticated way of knowing may also hold some naïve beliefs in a specific context, and conversely naïve learners may exhibit some sophisticated beliefs, demonstrating 'that epistemological beliefs do not necessarily develop in synchrony' (Schommer, 1994:302). Therefore, we may speculate that this uneven development of epistemological beliefs may have significant influence on learning (Brownlee, 2004).

As epistemological beliefs have an influence on students' learning it is therefore clear it is important to understand the implications of this for effective teaching in the context of higher education. It is understandable that in a learning situation the epistemological beliefs of the teacher will influence the design of the learning activity thus having a direct impact on the types of learning opportunities they plan for their students (Deissler, 2008; Brownlee et al., 2001; Wheeler, 2007). Bruner (1996) introduces the concept of 'folk' pedagogy where the implicit and unarticulated theories and assumptions held by the teacher about teaching are reflected in the theories and assumptions the teacher has about the learner. Thus it is important as teachers that not only are we aware of our students' beliefs but that we are aware of our own epistemological beliefs and design learning activities that model the application of sophisticated epistemologies (Deissler, 2008).

Knowing students epistemological beliefs 'can provide an alternative lens for teachers to use in understanding their students' ideas and behaviour, in assessing students' abilities and needs, adapting their plans and strategies for instruction' (Hammer and Elby, 2002:169). If, as Stacey et al. (2005:6) maintain, 'engendering sophisticated epistemological beliefs' in students is a critical function of higher education we need to question how we can promote these beliefs of knowledge in students. Brownlee et al. (2001) and Tolhurst (2007) implemented changes in course structure with the explicit focus on active, reflective and independent learning with intent to influence students' epistemological beliefs. The findings from both studies indicated that, to different extents, students' epistemological beliefs became more complex with

changes to personal study habits. Both studies concluded that student epistemological beliefs can be influenced by learning environment suggesting there are implications for how we as educators structure such learning environments, for example by encouraging students to reflect explicitly on their epistemological beliefs to facilitate the development of higher order beliefs (Brownlee et al., 2001). We can surmise students' beliefs of knowledge are critical components of understanding about student learning (Hofer, 2001) and will have implications for teaching at all stages.

This review concludes with Brownlee et al. (2009) suggestion that it is universities' responsibility to deal honestly with student expectations about learning. As they declare, initial experiences in higher education can be challenging for new students. Entwistle (2007) suggests that staff in higher education assume students to be well aware of the kind of learning they should be using. Even though tutors on the Foundation degree in this study are very aware of the eclectic backgrounds of the students in terms of variety of learning experiences before engagement on the Foundation degree there is a need to further understand the beliefs our students bring. I now detail the framework for this study.

Chapter 4: Research approach and methods

Human resources are like natural resources; they're often buried deep. You have to go looking for them, they're not just lying around on the surface.

You have to create the circumstances where they show themselves.

Ken Robinson

The exploratory nature of this study enabled an investigation of the relationship of student epistemological beliefs with their learning on a Foundation degree. In this section I set out the rationale for my research approach and its relationship with the methods of data collection underpinned by my personal philosophical beliefs as explored in Chapter 2. This study is a mixed method exploratory case study informed by a critical realist perspective. The study took place with a cohort of 36 students over two years of a Foundation degree in Teaching and Learning. Interviews and questionnaires were the methods of data collection used. I am aware the strategies chosen will have been influenced by my epistemological and ontological beliefs and the interpretation and analysis will also be influenced by these beliefs hence my attempt at making these clear to the reader.

In focussing on the experiences and perspectives of individuals it allowed me access to the spectra of meaning constructed by the participants in the course of their daily interactions which I saw as representations of reality rather than reality itself; so generating 'thick descriptions' of such meanings (Geertz, 1973 in Bryman, 2008:378). I consider individuals are active agents, in constructing their own knowledge integrating this information into their understanding. This action and interaction can take place as an individual, but in a social and cultural context where each context interacts and is shaped by the other so at all time continuously evolving. The critical realist stance taken in this research sees knowledge as 'as social and historical product that can be specific to a particular time, culture or situation' (Robson, 2002:34). Theories can change so they are 'real' for the world which they represent, but that world can change; therefore I designed my study to take account of the participants emerging worldviews.

4.1 Evolution of research approach

The main focus of this study was an exploration of the relationship of student epistemological beliefs with their learning on a Foundation degree. It reflects Yin's (2009) thinking about the purpose of case studies and the development of prior theoretical positions where the nature of the theoretical starting point of this research discussed in previous chapters has influenced and modified the research questions. A narrative of the resultant iterative process is now given to explain the three phase evolution of this study, and is also presented diagrammatically in Figure 4.

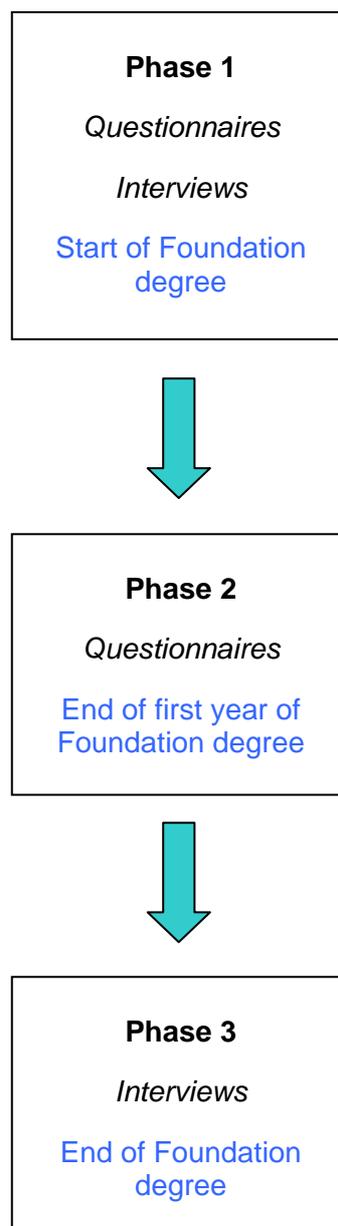


Figure 4.1 Three phases of research

Phase 1 research questions:

- 1 What beliefs do Foundation degree students hold about knowledge, learning and intelligence?
- 2 What is the relationship, if any, between students' epistemological beliefs and their engagement as a learner?
- 3 Is it possible to ascertain what these beliefs are so the strategies for teaching can be developed and therefore enhance University experiences accordingly?

Phase 2 research question:

- 4 Is it possible to ascertain any modification in epistemological beliefs over the course of a Foundation degree?

Phase 3 research question:

- 5 What are the implications of any change in beliefs over the Foundation degree?

The initial analysis of the data from the 3 phases moved the study on again and a further question emerged as the concept of transformation was revealed:

- 6 What is the relationship between students' epistemological beliefs and the occurrence of transformation?

This final question is explored with the transformative literature in the discussion chapter.

The philosophical approach offered by critical realism endorses the choice of methods dependent on the aims of the study thus accommodating the use of mixed methods in this study (Barrett, 2010). Initially an equivalent sequential design (Tashakkori and Teddlie, 1998; 2009), questionnaires followed by interviews, was used with the intention of using these methods on an equal basis in the analysis and interpretation to explore the epistemological beliefs of the Foundation degree students. In line with this design the data analysis began before all the data was collected (Onwuegbuzie and Teddlie, 2003). This initial analysis brought attention to the potential differences and significance of the data sets. Therefore, the initial sequential design changed to an iterative design where the data collection, data analysis and data interpretation lead to a recursive process in all three elements. The study developed in a dynamic and evolving manner where the findings in Phase

1 influenced decisions about methods at subsequent stages (Nastasi et al., 2010) leading to Phase 2 and 3 of the study.

In Phase 1 the first question relating to the beliefs and opinions of the cohort of Foundation degree students were sought through a two-part questionnaire, the Epistemic Beliefs Inventory (EBI) (Schraw et al., 2002) and Beliefs about Intelligence Scale (Dweck, 2000) (Appendix 3) at the beginning of their Foundation degree. There were three reasons for using questionnaires. Firstly, in terms of the mixed methods approach of this study it was not my intention to seek corroboration or convergence through the different methods but to use the data from the questionnaires with the interview data to seek a more comprehensive social understanding with the intention to 'elaborate, enhance, deepen, and broaden the overall interpretations and inferences from the study' (Greene 2007:100). Secondly, as it is believed that the understanding of the students epistemological beliefs are fundamental to the facilitation and enhancement of their learning experiences, it was hoped that the use of the questionnaires would indicate these beliefs for use in this study and for future use with the students. Finally, the questionnaires were used to enable purposive sampling of participants to represent a subset of the original set of participants for interview selection. Following initial analysis of the questionnaires five students, Emma, Liz, Maria, Rachael and Nicky (pseudonyms), were chosen to take part in in-depth interviews to explore their opinions about knowledge and knowing, learning and intelligence, thus examining question 1 in more depth and responding to question 2.

The initial statistical analysis of the questionnaires, using the Statistical Package for the Social Sciences (SPSS) version 16, demonstrated that I was not able to use the data as fully as I intended primarily due to an insufficient sample size to draw meaningful conclusions. Although this was a significant setback it allowed me to reflect on the purpose of the study. I therefore decided to make use of the questionnaire data through a 'before and after' comparison of the views represented. This resulted in Phase 2 of the study, specifically raising the question of whether it is possible to ascertain changes to epistemological beliefs as detailed in question 4. The students were asked to complete the same questionnaires at the end of their first year of study enabling an exploration of the initial research questions from a perspective of time.

The initial analysis of the 'before' and 'after' data demonstrated a shift in views for some of the participants. This, together with the preliminary analysis of the interviews, suggested some inferences which presented what Greene (2007:26) calls an 'empirical puzzle'; this warranted further analysis. The generative value of the mixed methods approach in this study permitted the lived experience to develop in unpredictable ways which then required me as the researcher to be responsive but remain systematic allowing me to actively pursue this puzzle (Barrett, 2010; Greene, 2007). This recursive approach facilitated an opportunity for a second set of interviews with the original interview participants to explore these views further as research question 5. The interviews were conducted at the end of the two years of study in Phase 3. The relative importance of different data sets in this study did not emerge until these later phases (Brannen, 2005), consequently leading to a different weighting with the interviews taking prominence enabling a further modification with the addition of research question 6. It was the iterative approach taken that allowed the notion of transformation to emerge through the analysis of the final interviews. The implication of this is explored in Chapters 5 and 6 through the presentation of the findings and resulting interpretations. As suggested by Greene (2007:101) this demand to respond to the changing situation in this study allowed 'unanticipated insights and perceptions' that contributed to a better understanding of the phenomenon of epistemological beliefs of Foundation degree students.

4.2 Ethical Considerations

I am responsible for my ethical commitments in this study which are modified by my epistemological beliefs. These beliefs are a product of my personal, social and theoretical experiences at this point in time and the ethical issues in this study are considered through and modified by this lens. I describe critical realism as the philosophical compass (Egbo, 2005:268) for this study but it is also the ethical compass where, as the researcher, I do not stand outside this study, rather my positionality is integral to this study and as such has been woven throughout the discussion. The integrity of the researcher is central to the study which includes an adherence to ethical principles, an understanding of power relations and the acknowledgement of assumptions and beliefs brought to the research. As the commitment to engage in ethically responsible research was central to this study the tenets of ethical practice in terms of moral principles and a guiding code have been integrated throughout every level of discussion, through the planning, implementation and analysis stages of this study. For instance, the very purpose of this research

came from a personal ethical and moral sense to better understand the learners on the Foundation degree. Care was taken not to impose the research design but to adopt a flexible approach allowing for change. This flexibility enabled the evolution of the research questions throughout the study as presented in this chapter. The analysis was an authentic process where the voices of the participants were central to the study as discussed in Chapters 5 and 6. What is now presented in this section is the explicit recognition made to observe the ethical guidelines laid down by the British Educational Research Association (BERA, 2011) and as required by the University of Exeter, ethics committee (Appendix 1).

The most significant aspect was permission from the participants, who were all adults over the age of 18, by way of voluntary informed consent. BERA (2011:5) explain this as 'the condition in which participants understand and agree to their participation without any duress, prior to the research getting underway.' Firstly I verbally explained the intentions of my study, also making clear the right to withdraw, and the issues of confidentiality and anonymity. Following this, those willing to participate signed a consent form (Appendix 2). All the students asked were willing to participate.

As a tutor I was already known to the participants so brought a level of familiarity. I was very aware of the potential concern of the possible issue with authority and power in the tutor/student relationship. As noted by Harris and Brown (2010) participants may respond in ways they deemed socially desirable in a given situation suggesting that interview data may be contrived or partial and incomplete representation of the participants understanding and point of view. However the familiarity enabled the interviews to be conversational and informal discussions. A rapport was built between myself and the interviewees, so much so that a year on they still question and challenge me about views discussed in the interviews.

Kvale and Brinkmann (2009) raise the question of ownership of the meanings. This could lead to a power game of who 'possesses the right to attribute the definitive meaning to a statement' (ibid.:218). However this assumes a fixed meaning rather than a post-modern tradition of a 'relational unfolding of meanings'. The issue of ownership is nonsensical in terms of ethics and power in this research. Through the interpretation and analysis I am bringing my perspective to the interviewee's views and ideas. Without their ideas and my interaction there would be no analysis, therefore no study. My search is not for reality but the co-constructed interpretation of

reality. I remain aware that the meanings attributed to the interviewees may be moderated by my explicit or indeed implicit theories. Thus throughout this study, at all stages, I have made explicit acknowledgement of my perspective and evolving frame of reference through a continued reflexive engagement with my assumptions and beliefs in the context of relevant social theory. This was not done to free myself of any prejudice, but to recognise these beliefs and their possible implications for this research hence providing a lens through which to view my analysis, so affording robustness in its application.

4.3 Critical realism as the philosophical compass for this study

Following on from the discussion of my own theoretical perspectives in Chapter 2 critical realism provides the 'philosophical compass' for this study and my odyssey (Egbo, 2005:268). Epistemological beliefs exist as mental phenomena, either consciously or unconsciously, and critical realism acknowledges the reality of mental phenomena (Maxwell and Mittapalli, 2010; Sayer, 2000). It is the reality and the implication of these beliefs on learning that I wished to explore.

Critical realism is critical because of the fallibility of any attempts to describe and explain the world, acknowledging that absolute knowledge of anything is not possible (Scott, 2006). Barrett (2010) describes an important tenet of critical realism is a world that exists independently of what we think about it, but it does not follow that there is immediate access to this world or that every aspect is observable suggesting there is a distinct difference between the world and knowledge of the world. Therefore critical realism is critical of our ability to know reality with certainty. Bhaskar (1975 in Sayer, 2000) relates this to the intransitive and transitive dimensions of knowledge. He explains that intransitive knowledge does not depend on human activity, i.e. knowledge of things such as gravity or death, which operate independently of human existence. I relate this to a belief in a perceived power relationship between tutor and student. Here the status of the tutor could assumed by both parties as an authority with the power as the expert of knowledge. Transitive knowledge however is seen as consisting of our knowledge of the world (Burnett, 2007). As Sayer (2000) explains there may be different theories about the world, that is different transitive objects, but the world they are about, the intransitive dimension, is the same. Thus in terms of the tutor/student relationship this structure of authority is recognised, but key here is how this awareness is acted on. As Burnett (2007) explains social structures are not always transparent to us and therefore have to be discovered. I agree with

Burnett's view that we can begin to know things that exist in the intransitive domain through interaction and experience of the world through an exploration of relationships to try to understand the world and bring about social change.

Central to critical realism is a stratified ontology where structures are differentiated from the agents that inhabit them (Bates, 2006). As Bates (2006) explains the underlying structures, that is the context in which actors operate, may generate events and discourses in which the actors operate but are non-reducible to these events and discourses, so the structures 'can only be identified through the practical and theoretical work of the social sciences' (Bhaskar, 1989:2 in Bates, 2006). Critical realism distinguishes between the real, the actual, and the empirical ontological levels. At the deepest or more abstract level Sayer (2000) describes that real is whatever exists regardless of whether it is an empirical object for us or that we have an adequate understanding of its nature. The real is the realm of underlying structures and mechanisms, causal or passive powers that may or may not be exercised. Generative mechanisms reside in the real domain existing independently but with the capacity to behave in particular ways and capable of producing patterns of events (Carlsson, 2005; Sayer 2000). Using the example of the tutor/student relationship the notion of authority of power and knowledge may not be activated and will only therefore be seen as a tendency; however, if it is exercised then reality moves into the actual domain (Burnett, 2007). It is the domain of the actual which refers to what happens if and when these powers are activated, where the observed events or observed patterns of events occur. At the empirical level is the domain of experience, where phenomena are observed and understanding is formed. Here there may be a realisation by the student that the power does not reside with the tutor and that knowledge can be negotiated with authority. However, Sayer (2000:12) argues 'observability may make us more confident about what we think exists, but existence itself is not dependent on it'. Therefore, what we experience through our senses or perceptions can by their very nature be misleading depending on how we interpret or perceive what we are seeing (Burnett, 2007). Essentially critical realism looks for the relationships between experiences in the empirical domain with the structures and mechanisms in the real domain through the dependent events in the actual domain.

Critical realism offers a view of causality and therefore a framework for studying underlying causal mechanisms which may be applied to the context and interactions of Foundation degree students. It recognises the mutual interactive nature of society and the individual, where there is a reality of mental states and attributes and treats

mental entities as real as physical ones and therefore as relevant to causal explanation of social phenomena, so values and beliefs are part of a reality not just a construction of the observer (Maxwell and Mittapalli, 2010:153). However, although these mechanisms are real and produce a social phenomena they are not directly accessible to observation and are discernible only through their effects (Bryman, 2008). This raises the question if epistemological beliefs can be seen as a mechanism, in that they affect the learning modes of the students, or if they reside in the empirical level and therefore can be observed.

Biesta (2010) questions the issue of causality and whether we can assume human action is caused and so laws and causes of action can be discovered, or should we assume that human action is motivated so we need to focus on intentions and reasoned action to understand better why people act in the way they do. However motivation is an action, the intentions or stimulus of which may be attributed to the structures or causal powers in place in a particular context and time (Biesta, 2010). The complex interactions of mechanisms may generate observable events which in turn may provide information on the existence of these unobservable entities (Barrett, 2010) but it is not a simple issue of mechanistic causality. Social systems are open and recursive with complex interactions between factors and the same causal powers can produce different outcomes in the complexity of open systems such as the social world (Barrett, 2010). Indeed I consider that students' epistemological beliefs and interactions are too complex to be able to explain or be reduced to causal or correlational terms; rather the purpose of this research is to understand relationships. Importantly in the context of this study the same mechanism may produce different outcomes according to context which can be compounded by an open system with many interacting structures and mechanisms. This may highlight the activation of different epistemological beliefs depending on context or domain. As Maxwell and Mittapalli (2010) stress it is not a simple case of variation across contexts but the context is intrinsically involved in the causal process and can not necessarily be controlled for. Moreover individuals' perspectives and their situations are seen as real but separate phenomena that causally interact with one another. This according to Maxwell and Mittapalli (2010) allows a framework for understanding the relationship between individuals' perspectives and the actual situations. Therefore, the 'social and cultural context of the phenomenon studied are crucial for understanding the operation of mechanisms' (Maxwell and Mittapalli, 2010:156). However, there is a danger here as Sayer (2000) cautions of attributing to one mechanism effects which are actually due to another, therefore care has been taken

to distinguish between what *can* be the case and what *is* the case in epistemological belief structures.

King (2004:19) describes society as consisting of ‘the complex web of social relations between people’. Rather than formal associations or regularities realists seek connections among these relations (Sayer, 2000). Constitutive of this social world is the relationship of structure and agency; this division is discussed throughout social theory literature as was raised in the literature review for this study. It is not my intention to review the debate here but rather, as I feel the notion of structure versus agency is implicit in this study, I am obliged to make my understanding of the connection clear. I am in agreement with Archer (2000) who conceives human agents as reflexive and creative who can act counter to societal constraints; agents are influenced by, but not determined by structure and culture. Whilst recognising this relationship critical realism proposes ‘that individuals reproduce and transform social structures as well as are formed by them, whilst social structures both shape and place constraints on individuals but are also the result of continuous activity by individuals’ (Burnett, 2007:6).

In summary, critical realism recognises the explanatory context of the phenomena studied without reducing the context to a set of variables thus relying on understanding the process of the occurrence of an event or situation rather than a comparative and reductionist stance (Maxwell and Mittapalli, 2010). Crawford and Wright (2010:3) summarise a critical realist orientation as a position which ‘implies a tendency to recognise complexity, diversity of perspective and differential practice.’ This allows an explanation of this single case and its unique circumstances recognising that there may be different responses to similar situations depending on specific personal or cultural characteristics (Maxwell and Mittapalli, 2010).

4.4 Case study design

The notion of case study shaped this research as I wished to understand a real-life phenomenon in relation to contextual conditions (Yin 2009). Easton (2010:119) describes case study as an opportunity to ‘tease out and disentangle a complex set of factors and relationships’ in a process of iterative–parallel research. As such a case study is suited to mixed methods enquiry as it has an ‘epistemological, ontological and methodological flexibility’ (Luck et al., 2006 in Greene and Hall, 2010:134). However, this flexibility did not lessen the rigour with which the case study procedures

were followed (Yin, 2009). I used Stake's (2005) principle that it is the object of study that defines the case limited by the consideration of the research questions and the context for research. According to Stark and Torrance (2005) case study assumes a social reality created through social interaction that seeks to identify and describe before analysing and theorising. Therefore, as Stake (2005) and Yin (2009) emphasise, the design of this study focused on optimising the understanding of the case thus privileging in-depth enquiry over coverage rather than generalising beyond it; that is the attention was on Stake's (2005:443) epistemological question: 'what can be learned about the single case'?

The strength of case studies is the observation of effects in real contexts 'recognising that context is powerful determinant of both causes and effects' (Cohen et al., 2007:253). They are able to demonstrate the complex, yet subtle, dynamic interactions of different factors in a unique instance. This case study allowed representation of a range of viewpoints, similar and divergent, by attending to social situations stressing 'social interaction and the social construction of meaning in situ' (Stark and Torrance, 2005:33). Therefore, this case study engages with the complexity of social activity with the purpose of representing meanings brought to the setting by individual social actors on a Foundation degree.

Robson (2000:185) suggests 'in one sense all enquiries are case studies' as they take place at particular times, in particular places, with particular people thus, as suggested by Yin (2009), many of the criticisms that have been directed at case study are similar to those that can be made about any research strategy: lack of rigour through not following systematic procedures, allowing biases and generalisability. The first two criticisms are addressed in the discussion on quality below; the issue of generalisation is addressed now. A theme that has run through this discussion so far is the polarity of views concerning different aspects of the study. Case study, it would appear, is no different; that is the issue of uniqueness versus generalisation. Simmons (1996) suggests we embrace this polarity as a paradox which will yield a unique and universal understanding. She claims the 'tension between the study of the unique and the need to generalise is necessary to reveal both the unique and the universal and the unity of that understanding' (Simmons, 1996:238). Case study is particular and descriptive and, whilst not generalisable, case study is not idiosyncratic and may illuminate more general issues (Stark and Torrance, 2005:33). However, as Yin (2009:15) argues, case studies maybe generalisable but to theoretical propositions rather than populations or universes, so expanding and generalising

theories. Therefore, a case study does not represent a sample and therefore does not enable statistical generalisation however theories can be expanded and generalised demonstrating what Yin (2009) calls analytical generalisation. Thomas (2011) suggests generalisation in any research is always tentative and provisional due to the unpredictability and variability in social life in human agency, furthermore case study is about making the connections and having insights with the aim of looking at relationships and processes. According to Healy and Perry (2000) this notion of theory building is in line with the critical realists view where theory has to be built before its generalisability to the population is tested.

A cohort of 36 Foundation degree students is the subject of this case study forming the contextual boundary, and therefore are the sample (Thomas, 2011). As a case study there is not the expectation that the participants represent a sample of the wider population of Foundation degree students. Nevertheless the selection of these participants, focusing on the uniqueness and particularity of the individual and group, within the milieu of the organisational, social, physical and related phenomena, would hope to give insights into other similar groups within this particular degree in the desire to comprehend complex social phenomena within their immediate individual context (Stake, 2005; Yin, 2009).

In summary this study concentrates on understanding the real-life context of those on a Foundation degree allowing for the exploration and illumination of the students self-perceptions and beliefs about knowledge, knowing and learning in their particular context. The value of case study research in this instance is its ability to enable examination of the issues defined by the research questions in a real-life setting through a flexible approach without a lessening of rigour.

4.5 Mixed methods approach

My aim here is not to add to the already substantial body of literature on mixed methods research but to clarify the position of this study, in relation to the critical realist's perspective, in this ever growing debate. Critical realism recognises that all observations and measurements are fallible and acknowledges that as reality cannot be known with certainty there is a need to measure phenomena in many ways through the collection of data to explore alternative explanations (Easton, 2010; Maxwell and Mittapalli, 2010). Furthermore, critical realism's stratified ontology allows for the legitimate combination of qualitative and quantitative data collection methods

thus enabling the recognition of the contribution that different research methods can make when made to work together sympathetically (Barrett, 2010). The use of mixed methods in this study were not seen at a technical level where the guarantee or truth or completeness was sought (Hammersley, 2005b) rather it was through a reflective approach that offered evidence to inform judgements. Further, it was not my intention to seek corroboration or convergence through the different methods but to seek a more complimentary understanding of the data (Greene 2007).

From my nascent research both in social and, formerly, natural sciences it would seem to me that it is a trait of human nature to classify in order to understand. However classification can be a reductionist process leading to dichotomies. I do not subscribe to the view that qualitative and quantitative are methods which fall into opposing paradigms; rather I concur with Biesta (2010) who argues that research cannot be seen as qualitative or quantitative rather only data can be described thus. Such data can be complimentary and selection should be about fitness for purpose where the 'complete researcher' should be prepared to make use of all that is available and the choice of method should be driven by the question that the research seeks to answer (Cohen et al. 2007; Cresswell and Plano-Clark, 2007; Gorard, 2002). A mixed-method approach was adopted for this study to 'serve particular theoretical, methodological and practical purposes' and where the 'resulting data are analysed and interpreted in relation to the methods and assumptions by which they were generated' (Brannen, 2004:324).

Denzin and Lincoln's (2005) notion of bricolage works well with the concept of mixed methods as it seeks to account for the complexity of the real world (Kincheloe, 2008). In addition Bryman (2008) suggests there is an intellectual bricolage rather than a deterministic connection between research strategy and epistemological and ontological commitments. Biesta (2010) and Hammersley (2005a,b) suggest there should be an active construction of research methods and tools at hand rather than the passive reception of methods just because they are associated with particular epistemologies. I do not believe that specific quantitative and qualitative methods have inherent ontological and epistemological positions; rather it is the researcher that brings the philosophical commitment to the strategies used. Bryman (2008:17) emphasises the representation of 'tendencies rather than definitive point of correspondence' between research practices and epistemological and ontological principles, and whilst there may be a philosophical commitments with certain research methods these connections are not deterministic. A researcher can choose which

methods are best suited to their research question but I do not think they can choose which assumptions to activate. Our epistemological and ontological beliefs are inherent in the worldview that we present to research. This is not to say that our worldviews cannot change on examination, rather our beliefs and assumptions are what make us react and respond in a way that we do. I do not believe that we can pick and choose which beliefs we might activate today. Maxwell and Mittapalli (2010) consider that our assumptions should not act as constraints on methods but rather they should be seen as lenses for viewing the world. Nevertheless the assumptions and purposes of the researcher always find their way into a research act, and they always make a difference in what knowledge is produced (Kincheloe, 2008). Even in the most prescribed forms of empirical quantitative inquiry the researcher's ideological and cultural preferences and assumptions shape the outcome of the research. So although Hammersley (2005c:144) proposes 'individual researchers should be free to identify the most productive areas of inquiry and to determine the most effective means for investigating them', Wellington et al. (2003) advise it is the researcher's responsibility for justifying and constructing a rationale for both their methodology and chosen methods.

As has been presented the choice of methods for this study were not made in a philosophical void (Dadds and Hart, 2001:169) and the research questions were thought about in relation to ontological and epistemological assumptions. Qualitative and quantitative were not seen as dichotomous positions as there was a more contextual understanding of the possible contributions of questionnaires and interviews in this study (Biesta, 2010; Greene and Hall, 2010; Hammersley, 2008). Rather than trying to reveal the whole picture (Silverman, 2010) the goal of this mixed method study was to create dialogue between different perspectives so should deepen understanding rather than simply to broaden or triangulate (Maxwell and Mittapalli, 2010). This, according to Greene and Hall (2010), is more likely to produce generative insights through meaningful engagement. Encouragingly, Kincheloe (2008a) assures me that the demand for such awareness of the intricacies of the tools and methods at hand, their uses and applications, is not something that can be accomplished in the doctoral programme, but is rather a 'lifetime endeavour.'

4.6 Methods

There is considerable variability in the research designs and assessment procedures used in the measurement of personal epistemological beliefs therefore I briefly

summarise and highlight some of the issues that were considered when planning this study. As an emerging area of research the literature is satiated with studies relating to the trial and validation of different instruments relating to the study of epistemological beliefs (E.g. Bendixen and Rule, 2004; Brownlee et al., 2009; Buehl and Alexander, 2005; Chan and Elliott, 2004; Elby and Hammer, 2010; Greene et al., 2008; 2010; Hofer and Pintrich, 2002; King and Kitchener, 1994; Kuhn et al., 2000; Schommer, 1990; Schraw et al., 2002). Duell and Schommer-Aitkins (2001) and Pintrich (2002) caution us about the use of different methodologies of the exploration of epistemological beliefs as theoretical assumptions may constrain, or indeed drive, empirical work. Pintrich (2002) explains that in the past models which assumed a unidimensional belief structure used interviewing methods found it hard to separate out different dimensions; therefore, it is not surprising that empirical self-report instruments, which start with the assumption of different dimensions, ultimately find these factor structures. It is therefore essential to bear in mind the theory behind the instrument.

The assessment of epistemological beliefs that are for the most part unconscious is a challenge, and Bendixen and Feucht (2010) and Schommer-Aitkins et al. (2010) question whether this complexity can ever be captured. Schraw et al. (2002) question the efficacy of paper and pencil instruments in measuring epistemological beliefs and suggest there should be collaboration between self-report surveys and in-depth verbal interviews. Recently there has been a shift from the dependence on one method to the use of a diversity of methods in personal epistemological studies and, as Pintrich (2002) and Schraw et al. (2002) propose, this should be continued where appropriate. Even if these beliefs are accessible Elby and Hammer's (2010) view is that we cannot assume stability in student epistemological beliefs and therefore methods are needed to probe different contexts within and across domains.

In regard of this debate questionnaires and semi-structured interviews were the methods of data collection in the three phases of this study (Figure 4.1). It was anticipated that the analyses of these two datasets would be mutually illuminating (Bryman, 2008) and the rationale for the choices are now given. Questionnaires are presented first followed by interviews to represent the chronology of the study.

4.6.1 Questionnaires

It is clearly challenging to design a set of questions that conceptualise the complexity that is the epistemological belief system. As Schommer-Atkins (2004) maintains, quantifying epistemological beliefs is, by their very nature, difficult. Therefore, rather than designing a new instrument two established and validated instruments were chosen to help build a picture of the beliefs that the participants held about knowledge, knowing, learning and intelligence and facilitate the choice of participants for the interviews. These were:

- i. Implicit theories of intelligence scale: Beliefs About Intelligence (BAI) (Dweck 2000) (Appendix 3)
- ii. The Epistemic Belief Inventory (EBI) (Schraw et al., 2002) (Appendix 3).

The BAI (Dweck, 2000) and the EBI (Schraw et al., 2002) are both Likert-based scales to which individuals indicate the extent they agree or disagree with the statement. The 5-scale response formats were left unchanged as it was felt that any such changes would compromise the established validity and reliability of each instrument. The neutral point 'neither agree nor disagree' included in the Likert-scale instruments was to avoid forcing the participants into expressing either agreement or disagreement when they may lack such a clear opinion. Whilst this forcing can sometimes risk data quality it was felt the option of a midpoint may deter a random choice between agreement and disagreement (Johns, 2010).

Even though self-report instruments are convenient, efficient and form the basis of much of the current research on epistemological beliefs and learning I needed to be cognisant of their limitations (Duell and Schommer-Aitkins, 2001; DeBacker et al., 2008). To help with this the questionnaires were piloted with a group of 8 second-year Foundation degree students which resulted in some slight changes concerning the wording of the EBI (Appendix 4). These specific changes are justified in the next section.

The data from these questionnaires were scored in a dichotomous way with naïve versus sophisticated rather than a progression of views, therefore the subtleties of the questions could not be taken into account (Smith and Wenk, 2006). This also means the participants were unable to question or elaborate on their understanding. Moreover, as Hofer (2002) indicates there is a potential issue of the measuring of the construct where the participant may disagree with the statement but that this may not

necessarily mean there is agreement with the opposite. For example, Hofer questions whether we can capture the complexity of knowledge using items that refer to simplicity, as she suggests the acceptance of complexity is not necessarily the same thing as the rejection of simplicity. There is also the propensity to respond positively to items irrespective of item contents or general tendency to overstate favourable attributes in Likert scales (Friborg et al., 2006). To help mediate some of these issues a small number of negatively worded questions were included. However, as noted by Murphy et al. (2010), some participants can have difficulty with these, so in accordance with the recommendations from the pilot group I made it clear to the participants there were such statements.

There was clearly a difficulty in knowing what the participants were thinking when completing questionnaires (Hofer and Pintrich, 1997; Muis et al., 2006) more so as the questionnaires were not contextualised. Alexander and Sinatra (2007:227) also draw attention to the issue of measure interdependence; that is 'the content or focus of one item can affect thoughts and responses to subsequent items'. However, Schommer-Aitkins (2004) argues by narrowing the focus of assessment to domain-specific epistemological beliefs researchers are likely to get higher reliability but this contextualisation brings with it the idiosyncrasies that make up the context. Furthermore Wheeler (2007) claims depending on the context applied to the statement it could elicit either a naïve or sophisticated response from the same participant, therefore to judge a participants response as naïve or sophisticated it is important to understand the contextual formation of the response. These issues can be mitigated but not totally removed, as was done in this study, by asking students to focus on a particular context, in this case as a learner in a new situation of beginning a Foundation degree and not to 'over think' the questions. The subsequent inclusion of interviews and the more contextualised use of language I hoped would provide evidence regarding the nature of the participants' personal beliefs (Elby and Hammer, 2001; Pintrich, 2002).

i. Beliefs About Intelligence scale (BAI)

According to Dweck (2000) a person's implicit theory of intelligence can shape responses to academic challenge and opportunities to improve performance. Students with an entity theory are more likely to view their intelligence as fixed and will focus on performance goals as opposed to incremental theorists who focus more on learning goals in the belief that their intelligence is malleable and has the potential

to change. As has been explored in the literature review these two ways of thinking about intelligence may be linked to beliefs about knowledge and knowing, and therefore can have consequences for Foundation degree students engaging in a new challenge at a critical point in their lives. Dweck's (2000) theory of intelligence scale, the BAI, was developed as a measure of exploring self-theories about intelligence. It consists of six items (Appendix 3). Questions 1, 2 and 4 are entity theory statements, and questions 3, 5 and 6 are incremental theory statements. As an instrument with high construct validity and reliability (Blackwell et al., 2007; Dweck et al., 1995; Dweck, 2000) it was felt that the use of this alongside the other measures would help develop a deeper understanding of the student's belief systems in relation to their learning.

ii. The Epistemic Belief Inventory (EBI)

The Epistemic Belief Inventory (EBI) (Schraw et al., 2002) was adapted for use in this study to elicit students' beliefs about knowledge and knowing (Appendix 3 and Appendix 4 showing adaptations). The EBI is a 28-item, 5 point, Likert-style questionnaire. It was designed by Schraw et al. to measure the five epistemic beliefs described by Schommer (1990): certain knowledge, simple knowledge, quick learning, innate ability, and omniscient authority. Schommer's original Epistemological Belief Questionnaire, a 63-item instrument, has been used quite significantly in epistemological belief research by Schommer and others but factor analysis has not yielded any consistency of the five factors (Chan and Elliott, 2004; Brownlee et al., 2001; Schraw et al., 2002; Schommer-Aitkins, 2002). When used in a previous study (Osborne, 2007) it was found to be unwieldy, yielding a large number of interpretable factors that did not necessarily fit into the five factors it was supposed to elicit. The aim of Schraw et al. (2002) was to develop a shorter instrument that measured all five hypothesised beliefs and that was more reliable. They found that the EBI closely identified the five dimensions, also showed better predictive validity and better internal and external reliability (with coefficient α all above 0.6 in test-retest values showing more than moderate reliability) than the EBQ. The EBI also explained 60% of the total variation with a retest value of 64% one month later. They suggested the reasons for this were that there were a smaller number of homogenous items loaded highly onto one of five observed factors.

Following recommendations from the pilot of the original EBI questionnaire minor adaptations were made to facilitate the understanding for the participants in this study

whilst still maintaining the original sense of the questions (Appendix 4). In summary, throughout the questionnaire the use of 'students' was replaced by 'people'. The term 'professor' was removed and 'teacher' inserted to be more in line with what the students would be used to (Question 12 and 17). The notion of 'theory' was replaced with 'idea' as the pilot group suggested the notion of engaging with theory at the start of the Foundation degree may be intimidating (Questions 10 and 12). The pilot group also suggested that at the beginning of a degree the thought of reading a whole academic chapter could be overwhelming, therefore 'chapter' was substituted for 'paragraph' (Question 20). Finally the notion in Question 21 that science might be easy to understand because it has so many facts was thought to be contradictory for students for whom science is never easy, therefore 'science' was replaced by the more generic 'subject'.

4.6.2 Analysis of the questionnaires

The EBI consists of five subscales: simple knowledge, certain knowledge, omniscient authority, quick learning, and fixed ability (Table 4.1).

	Simple	Certain	Omniscient	Quick	Fixed
Questions	1, 10, 11, 12, 17, 21, <u>22</u>	<u>2</u> , 18, 23, <u>28</u>	4, <u>6</u> , 7, <u>19</u> , 25, 26	3, 9, 15, 20, 27	5, 8, 13, 14, 16, 24
Lowest score = naïve viewpoint	7	4	6	5	6
Highest score = sophisticated viewpoint	35	20	25	25	30

Table 4.1 Epistemological beliefs represented by the EBI and possible scoring.

The language in the questionnaire suggests a more naïve view for each statement and so the label for each subset also represents the more naïve view of these subsets. There are 5 negatively worded statements denoted by the underscored items; these were reverse scored. Each item was scored from 1-5, the lowest score demonstrating a more naïve view and the higher the score demonstrated a more sophisticated view. This enabled each subscale to be grouped together from all the

participants with a low score signifying a naïve view within each subset and the higher score indicating a more sophisticated viewpoint. On the BAI three questions were entity theory statements (1, 2, 4), and the other three were incremental theory statements (3, 5, 6). The entity statements were reversed scored so demonstrating parity with the scoring on the EBI.

In summary, the more sophisticated epistemological world view was associated with beliefs in complex, tentative, uncertain, incremental knowledge derived from reason and a belief that intelligence is malleable contrasting with a naïve epistemological worldview where knowledge is simple, stable, certain, absolute, and transmitted by authority and intelligence is viewed as fixed (Schraw and Olafson, 2002; Hofer, 2000; Kuhn et al., 2000).

The value and intent of this method of data collection in this study was challenged during the initial phases of analyses of the questionnaires, as the initial comparative analysis of this data and that of the interviews indicated discrepancies. These discrepancies, as has been explained, initiated a phased recursive approach to the study (Fig. 4.1) where, following a repeat of the questionnaire, the interpretation of meaning from both sets of questionnaire data was interrogated in more depth alongside the meanings that emerged from the interview data. This was achieved through an adaptation of the constant comparison method explained below.

4.6.3 Interviews

Interviews were used in this study to recognise the voice of the many voices of our society (Crotty, 2003) and how reality has been constructed by the individual as part of a community. However, as highlighted by Fontana and Frey (2005), the interview is not a neutral tool. The interviewer and interviewee bring with them conscious and unconscious motives and beliefs, historically and contextually located. It was these unconscious and conscious beliefs of the participants that I hoped to explore, therefore allowing the active nature of the interview to lead to a 'contextually bound and mutually created story' (Fontana and Frey, 2005:696).

Semi-structured interviews were carried out in Phase 1 and Phase 3 of the study with the same 5 participants. Purposive sampling was used to select the participants. It was a strategic choice based on individual answers in the initial questionnaire and therefore their perceived relevance to the research questions being posed (Bryman,

2008). The interviews took place initially during the first 6 weeks (Phase 1) of their Foundation degree and then two years later during the final 6 weeks (Phase 2) of the degree. In both interviews their beliefs and understanding of learning and knowledge were explored. Prior to the first interview the students received a letter describing the aims of the interview and basis of the questions (Appendix 2). The actual questions were not shared with them as I was interested in their immediate responses, rather than prepared responses, about learning and knowledge. I adopted a semi-structured interview approach where the initial questions asked were in a similar format but were sufficiently flexible to allow me to follow up different issues raised. The questions that formed the basis of the semi-structured interview were adapted from Brownlee (2001) (Appendix 5). The interviews took between 25 and 40 minutes and were digitally recorded and transcribed. By undertaking the transcriptions myself allowed complete immersion in the data.

Kvale and Brinkmann (2009) describe the transcription process as a conversational interaction between two people which, during a translation from an oral discourse to a written discourse, becomes abstract and fixed through a series of judgements and decisions. This abstraction happens in two places: firstly the loss of live environment and body language during the audio recording, and secondly, the tone of voice and intonation are lost in the transcription of oral and written form. Therefore, through the very act of recording and transcription the 'naturalness' of the situation has already gone. Flick (2009) describes the transformation into text a construction of a new reality and suggests this is the only version of reality available during interpretation. Moreover Kvale and Brinkmann (2009) suggest there is a need to recognise the socially constructive nature of the transcript where transcription is an interpretive process rather than a clerical task. Thus, they conclude, as transformation occurs in the transcription process the notion of a verbatim interview transcription is flawed from the outset as the change from oral to written form produces hybrids of both rather than absolutes of either. This can be further compounded by the concept of a sentence seen as a tool in written language but which does not always transcribe accurately from oral language. Therefore, Kvale and Brinkmann (2009) suggest a more useful question is 'what is a useful transcription for my research process?'

I believed the true objectivity of transcriptions was not possible as the interpretation would always be mediated by my own assumptions; thus the interviews were transcribed adhering to a truth but not verbatim. Consequently for this study, as a linguistic analysis was not required, it was more suitable to communicate the

interpreted meaning through a literary style which highlights nuances of the statements and conversations. Following both sets of interviews the transcriptions were sent to the participants for member checking for the participants to confirm that it represented a reasonable account of the discussion as they remembered it.

Meanings are constructed as people engage with the world they are interpreting. Not that there are multiple truths but there can be multiple interpretations and therefore meanings. Consequently what we see and hear is mediated by the environment of recording and thus will influence the analysis (Silverman, 2006), so although we may follow commonsense routines and ground rules of interviewing, these interviews did not represent objective decontextualised data. The flexibility of the semi-structured interview, whilst being able to draw on significant issues that emerge, also meant that other matters may be missed (Patton, 2002). However, as the interviews were inevitably bound up with the participants' constructions of reality this flexibility was seen as an opportunity to probe understanding.

4.6.3 Analysis of interviews

Throughout the analysis I needed to be mindful of the different 'voices' in the interview data, what was included or excluded, and how these were represented in terms of the participant and myself as interviewer (Fontana and Frey, 2005). Kvale and Brinkmann (2009:212) emphasise the questions posed to the text will be 'influenced by the researcher's presuppositions and thus codetermine the subsequent analysis'. As the interpreter I am very much part of the analytical process with a conscious acknowledgement of my assumptions throughout this study. This called for a reflexive approach in the analysis and interpretation process. I am in agreement with Fontana and Frey (2005) who maintain we have moved beyond the platitudes of a neutral and unbiased researcher to an understanding of problematic and contradictory nature of data alongside the 'tremendous' influence of the researcher as author (ibid.:714). I have not treated the interviews as reporting a reality, rather as representing different perspectives which draw on available cultural and historical resources (Silverman, 2006). This is more pertinent when considering by very act of asking questions I have instigated thoughts in my participants that they had not considered before. Moreover as Buehl and Alexander (2006) warn when trying to access individual beliefs about knowledge we need to be aware that it can alter and distort these beliefs. Therefore, during analysis I tried to avoid the reification of statements through an understanding that the written form was a continuation of the

interview in a social co-construction situation so 'folding its horizon of possible meanings' (Kvale and Brinkmann, 2009:193). Put simply I tried to attend to the meaning of the stories woven by my participants whilst interposing my own perspectives in the attempt to make meaning (Fontana and Frey, 2005).

Kvale and Brinkmann (2009) describe a two-stage story of analysis: one, interviewee to researcher and two, researcher to an audience. I would add an intermediary stage of research to self as researcher; the analysis. It is in this intermediary space that I spent most of my time. However, as advised by Kvale and Brinkmann (2009), it was important not to let the analysis stage be magnified to a point where the story told by the interviewee becomes so fragmented that the holistic nature of the interview is lost; nor where the text of the interviews became more important than the interviews themselves.

Sayer (2000) describes social phenomena, as seen from the critical realist perspective, as intrinsically meaningful, that is the meaning is both externally descriptive and constitutive of the social phenomena. Moreover the social phenomena that we, as researchers, seek to understand are dependent on our conceptions of them. This meaning has to be understood as it cannot be measured or counted and hence, according to Sayer (2000), there is always an interpretive or hermeneutic element to analysis. Indeed the analysis in this study was inspired by the hermeneutical tradition of interpretation. Hermeneutics can be defined as 'the art or science of interpretation' of texts (Wellington, 2000:197) with the interpretation of meaning as the central theme (Kvale and Brinkmann, 2009:51). Crotty (2003) adds that modern hermeneutics determine meaning as a matter of practical judgement and common sense, not just abstract theorising. Thus contemporary hermeneutics can be seen both as a philosophy and as a specific mode of analysis (Myer, 2004).

Critical realism allows a reconciliation of objective and subjective dimensions of social life enabling a hermeneutic approach to analysis. King (2000) argues that hermeneutics does not reduce social reality to the mere correspondence of an individual's interpretation of it. Rather, he says, hermeneutics understand this reality as a 'complex network of social relations and collective practices coordinated by shared understandings' (King, 2000:375). However, the socially constructed hermeneutic nature of interpretations can rise to different and conflicting interpretations (Myer, 2004). Although some would consider the possibility of different or multiple interpretations of interview a weakness Kvale and Brinkmann

(2009) suggests that there is not an objective one and true meaning therefore post-modern hermeneutical thought allows for legitimate plurality of interpretations in what the text means to the interpreter. Moreover Schwantz (2001) sees hermeneutics as a central feature of all knowledge understanding, so resists the notion that there can be one authoritative interpretation. Therefore, it becomes evident why it is important to be clear and open about the evidence and arguments that enter into interpretation so that other readers can test interpretation (Kvale and Brinkmann, 2009:213).

So through the hermeneutic process understanding arises out of interpretation. However interpretation comes from the self through the lens of our own preconceptions. Gadamer (1976b in Myers, 2004:110) advocates the need to become not only aware of our own views and biases but to be mindful of how they may be determined by our own culture and personal history. Interpretation is socially and historically situated which then shapes the interpreter's perceptions and experience (Kinsella, 2006). Therefore, we need to become aware of how our own biases and personal history have an impact on how we view the world. As Fontana and Frey (2000) argue, if we wish to treat the participants in our studies as human beings we can no longer remain objective, faceless interviewers, but must disclose ourselves and learn about ourselves in our attempts to learn about others. Moreover Fontana and Frey (1994:373-4) suggest 'in learning about the other, we learn about the self...and must disclose ourselves, learning about ourselves as we try to learn about the other'. This notion was apparent where, through a reflexive stance, I began to understand the liminality of my own position. In addition, Crotty (2003) warns of the potential to mislead interpretations if not set in a genuine social and historical perspective. As he explains we are born into a world of meaning and view our world through the lens of our culture. This lens will inevitably polarise some aspects whilst blocking others. Through this construction of meaning people therefore come to construct their understanding and knowledge that this is often then tempered and bounded by the social, cultural and historical conventions of the communities in which they lie. Therefore it was recognised that the narrative that emerged from the interviews was a social construction of knowledge and understanding activated, yet bounded, temporally, socially and culturally.

The notion of the hermeneutic circle is applied to the analysis in this study, as can be seen in the description of the analysis process below. The circle refers to the 'dialectic between the understanding of the text as a whole and interpretation of its parts' (Gadamer, 1976:117) where the 'the movement of understanding is constantly

from the whole to the part and back to the whole' (Gadamer, 1989:291 in Crotty, 2003:104). Therefore, it follows that to understand the whole we must have an understanding of the constituent parts, but to have an understanding of these parts we must be cognisant of the whole. This process surely embraces the complexity and evolving nature of understanding; as more data or information are added our understanding of the parts change so modifying the whole. We can take this a step further by recognising that the text of the interview does not speak simply for itself neither is reducible to just my interpretation (Sayer, 2000). This circle evokes again the metaphor of Indra's web where each crystal is a part of the whole yet reflects the whole.

A constant comparison method, which reflects a hermeneutic process, was the underpinning method used for analysis. Glazer (1965:437) advocates the use of the constant comparative method when the wish is to generate theoretical ideas which are 'integrated, consistent, plausible, close to the data'. Silverman (2010) suggests the process of constant comparison where analysis begins in a small part of the data so generating a set of categories, these emerging hypotheses can then be tested by expanding to other data eventually analysing all data. The inspection and comparison of all data allows the emergence of themes through a summary of the essence of the data (Thomas, 2011; Silverman, 2010). This was done through a systematic approach with a constant redefining and reintegrating of theoretical notions as the material was reviewed. It was important to embrace the variety that existed within the data, to be aware of both of the commonalities and differences, as such comparisons increased the internal validity of the findings (Boeije, 2002). This process enabled me to actively seek out correlations and anomalies. However, it must be stressed that anomalous data were only treated in the context of my interpretations of the data through the lens of the study question.

The data remained expressed as language without a quantitative transformation whilst the data were dealt with systematically rigorously and with discipline (Kvale and Brinkmann, 2009). The procedure for interview analysis was adapted from the constant comparison method as explained by Glazer (1965) and Boeije (2002) but was influenced by Kvale and Brinkmann's (2009) analysis that focuses on meaning. The following is a description of the process followed for all five interviews:

1. *Initial exploration.* Each interview was read through to get a sense of the whole.
2. *Comparison within a single interview.* Comparison and coding of as many units of analysis as relevant was conducted within a single interview with the intention of developing categories. Each coded unit within the same category was compared as each edition was made. The constant comparison of the coded units enabled the initial generation of theoretical properties of each category. The consistency of the interview as a whole, in context, was examined noting similarities and discrepancies.
3. *Comparison between interviews.* Once each interview was analysed it was compared to the others. Comparison of each coded unit with the properties of the category was made so beginning to legitimise the properties of each category.
4. *Comparison with questionnaire data.* Categories were compared with similar categories from questionnaire data.
5. *Delimitation of the theory.* As the analysis moved from the smaller coded units to sets of categories with a reduction of terminology in the process of generalising, theory began to evolve. This meaning was then interrogated in terms of the purpose of the study. In turn this allowed a return to the original data and the set of categories viewing through the lens of the evolving theory.
6. *Exploring and writing the theory.*

It should be reiterated at this point that although the above description is focused on the details of the interview analysis, in keeping with the mixed methods approach, the data analysis was a recursive process which oscillated between the interview and questionnaire data throughout the different stages of the data analysis process. The data sets were mutually informing with the interview data eventually taking precedence. Boeije (2002) makes it clear that it is not important to compare everything with everything but to conduct the comparisons according to a sound plan in relation to the research questions. Therefore meaning that arose out of the constant comparison process followed the contexts of interpretation as proposed by Kvale and Brinkmann (2009:214). Firstly, self-understanding arose through a condensation of meaning of the interviewees' statements from their own viewpoints as understood through my lens. Secondly, analysis then included a wider frame of understanding, including the analysis of the questionnaire data, so developing a critical commonsense understanding with a focus on the content of the statement or person. Thirdly, theoretical frames for interpreting meaning of the statements were applied.

It is my intention that my analysis should be comprehensible though a presentation of my own perspectives so the evidence and argument can be tested, although, as Stake (2005:445) suggests, as a researcher, my knowledge of the case faces 'hazardous passage from writing to reading'. My communication of this study, through this written form, will cause my meanings to aggregate or attenuate. I am also aware that my reader will view this case through their own lens and worldview and therefore will possibly reconstruct the knowledge with different connections as we do not know 'readers peculiarities of mind' (Stake, 2005:455). Therefore in presenting my interpretation of this case, whilst I hope I communicate my interpretations and analyses effectively, I understand that seen through a different worldview interpretation of this case may well be different.

4.7 Quality control

There is clearly a need to establish the quality of the research throughout the study, however the discussion and judgment of quality is contested in social research designs (Bryman, 2008; Cohen et al., 2007; Hammersley, 2005a; 2005b; Golafshani, 2003; Lincoln and Guba, 1985; Seale, 1999; Silverman, 2000; Yin, 2009). According to Yin (2009) four tests are common to all social science methods: construct validity, internal validity, external validity, and reliability, however Silverman (2000) suggests that absolute reliability and validity are impossible to attain whatever reasonable steps can be taken to improve them. In addition Cohen et al., (2007) suggest that demonstrating reliability and validity can be difficult given the uniqueness of situations in a case study, where each case will have different value perspectives and where the value relevance is inherent in a meaningful relationship with the case. In this study, this is further compounded by the mix of methods used giving rise to both qualitative and quantitative data. It is not necessary to rework this debate here, rather validity and reliability are terms used and seen in the context of this study to 'reflect the multiple ways of establishing truth' as 'trustworthiness, rigor and quality' (Golafshani, 2003:604). Using Guba and Lincoln's (1985) notion of trustworthiness Seale (1999:467) suggests it is this concept that 'lies at the heart of issues conventionally discussed as validity and reliability'. How we judge trustworthiness and quality has to be central to the research design which raises the question: 'How can an inquirer persuade his or her audiences that the research findings of an inquiry are worth paying attention to?' (Lincoln and Guba, 1985:290).

Clearly trustworthiness is not an absolute term rather it is 'always negotiable and open-ended, not being a matter of final proof whereby readers are compelled to accept an account' (Seale, 2004:172). In accordance with my views on reality the social phenomena studied here exists in the minds of people therefore bringing to this study the possibility of multiple realities. Therefore, it is not about asking which of these assumptions is right but rather which provide a better fit to the phenomena I seek to understand. As made clear I do not believe there is a single reality therefore there is not a single outcome of this study. Furthermore the variables or factors cannot be singled out rather they will influence and interact with each. Consequently in this study I use the terms reliability and validity underpinned by the notion of trustworthiness through the key themes that emerge from Hammersley (2005b) and Thomas' (2011) notions of quality in social science research: open and clear justification for decisions made and the processes undertaken, and the ensuing claims made are argued and rationalised through critical engagement with the data in the broader context of the study.

Reliability

Reliability may refer to the stability or consistency of measurements (Lewin, 2005) or the consistency and trustworthiness of research findings (Seale, 1999; Kvale and Brinkmann, 2009). The reliability of qualitative measures may be regarded in terms of accuracy and comprehensiveness of coverage (Cohen et al., 2007) or dependability (Lincoln and Guba, 1985:300); whereas, in terms of quantitative measures, reliability is linked to the question of stability, consistency and replicability over time, for instruments and groups of respondents (Cohen et al., 2007; Bryman, 2008). Where applicable the reliability of specific instruments used is discussed in the context of the instrument used.

Due to the nature of case study there is no assumption of repeatability (Thomas, 2011). The natural occurrence of the phenomena and the uniqueness and idiosyncrasy of the social situation of the students on a Foundation degree course negates the possibility of this kind of replication. According to Yin (2009) the issue of reliability may be addressed if viewed from the principal of doing the same case over again, not replicating the results of one case by doing another case study. This therefore necessitates openness and transparency in the documentation of the actions. Accordingly, as Yin advises, the procedures and protocols of this study have

been documented with thoroughness and honesty to secure such a reliability, with the notion of trustworthiness at its heart (Seale, 1999).

Validity

In social sciences validity demonstrates whether a method investigates what it purports to investigate (Kvale and Brinkmann, 2009). However, it is also historically associated with measurement where it is a question whether the instruments collected measurements required to answer the research question (Lewin, 2005). The term of validity has so many diverse meanings (Teddlie and Tashakkori, 2003) and is good to know that Creswell and Miller (2000) sympathise with novice researchers in their attempt to understand the notion of validity. Nevertheless, no matter the level of experience of the researcher, there is clearly a need for some kind of qualifying check (Golafshani, 2003). From a critical realist position validity is not determined by procedures (Maxwell and Mittapalli, 2010) or methods (Robson, 2002) rather I attend to the evidence from the specific context and the question of this study (Creswell and Miller, 2000; Greene and Hall, 2010).

Silverman (2010:275) suggests 'validity is another word for truth'. However truth depends on the context and the lens of view of the participants, the researcher and the reader. Kvale and Brinkmann (2009:246) expand this notion suggesting validity concerns 'the truth, the correctness and the strength of statement' with an argument that 'is sound, well-grounded, justifiable, strong and convincing'. My understanding of truth was discussed earlier in terms of my ontological and epistemological beliefs which bring us to Creswell and Miller's (2000) suggestion that the validity procedures are governed by the lens of the researcher and the researcher's paradigmatic assumptions. In addition, Kvale and Brinkmann (2009) suggest it is both the craftsmanship and the credibility of the researcher which becomes essential. A further test of validity, according to Flick (2009), is whether the reader finds the account believable thus relating to Seale's (2003) notion of trustworthiness not being about proof but about how compelling the account is. Thus validity in this study follows Hammersley's (2005b) notion and is seen in terms of a judgement about the plausibility of the claim being made in terms of the evidence presented. This should be apparent throughout my entire research process where each step is reasonable, defensible, and supportive of the claims and conclusions (Kvale and Brinkmann, 2009).

Construct validity identifies the correct and appropriate methods for the concepts being examined (Yin, 2009). Criticism has been levelled at case studies for a failure to develop a sufficiently operational set of measures or that subjective judgements may be used to collect data, therefore Cohen et al. (2007) recommend a clear articulation of the construct. The construct in this case of personal epistemologies have been fully explored and debated in the context of wider literature. Cohen et al. (2007) and Yin (2009) also advise that the participants must understand what is being asked of them. The questionnaires used were adapted from published studies and were piloted to mediate this issue. The issues of construct validity of the questionnaires are discussed with the introduction of the instruments used. I believe that the construct and the categories that were used in the interviews were meaningful to the participants in as much the purpose of the interviews is where the meanings were explored. In addition respondent validation, a form of member checking, was also used where the transcribed interviews were sent to the participant for validation. This gave the participants the opportunity to engage further with the process and to verify a shared understanding of the transcribed interview. The intention was not to come to a fixed truth of reality; indeed at every stage of interaction with participants their ideas and thoughts had changed and developed. This has since developed into a continued dialogue with three of the participants.

Triangulation

As Mathison (1998) posits the triangulation strategy is not a technological solution to data collection and analysis as it does not make sense of some social phenomenon itself but as a technique it provides evidence for the researcher to construct meaningful propositions and plausible explanations about the social world through a holistic understanding of the specific situation and context. Triangulation can be defined as 'the use of two or more methods of data collection in the study of some aspect of human behaviour' in the attempt to explain 'the richness and complexity of human behaviour by studying it from more than one standpoint' (Cohen et al., 2007:141). The use of two different methods in this study helped mediate possible bias or distortion of what was being researched and enabling confidence that the data generated are not an artefact of one specific method of collection. There was not the assumption in this study that a convergence of data would equal the truth as other issues were cancelled out, nor that they would reveal the whole picture providing a definitive account or explanation. This notion of truth, from my perspective, is clearly

not the case as objective reality can never be captured as we can only know a thing through its representation (Denzin and Lincoln, 2005). As Mathison (1998:17) suggests the convergence of data upon a single proposition is a 'phantom image' as data may be inconsistent and contradictory as well as convergent, so equal regard should be given to results that are divergent or dissonant (Greene and Hall, 2010). As was the case in this study the data did conflict with each other necessitating careful and reflective judgments. Clearly favouring one set of findings over another was not an appropriate action to reconcile these contradictory or inconsistent findings (Bryman, 2008), rather the interviews were used to explore the meaning that was represented through the engagement with questionnaires. Also as there was a time lapse of 18 months between the two sets of interviews I was interested in the change and development of beliefs rather than the verification of these beliefs. Thus, during analysis, identification of complimentary and conflicting cases was recognised. So the overall tenor of the results of the combined use of the research strategies was mutually reinforcing (Bryman, 2008). It is perhaps more apt to describe the multi-method approach as adding to the richness of these data rather than its completeness (Silverman, 2000) leading to an account that readers will find believable (Flick, 2009).

In conclusion, rather than a rigid, fixed, two dimensional object as portrayed by the image of a triangle Richardson (2003) suggests a crystal which combines 'symmetry and substance with an infinite variety of shapes, substances, transmutations, multidimensionality, and angles of approach' defines validity in postmodernist texts (Richardson, 2003:570). This perspective might be aligned with what Foucault (1981 in Thomas, 2011) describes as a 'polyhedron of intelligibility'. Rather than social science research looking from a one-dimensional perspective Thomas (2011:4) interprets this as a view from several perspectives giving a more balanced, rounded, richer view of the subjects of research. This complexity and interconnection of perspectives again evokes Indra's web 'where the number of whose faces is not given in advance and can never properly be taken as finite' (Foucault, 1996:277 in Thomas, 2011). The shifting shape of Richardson's crystals allows for both external reflection and internal refraction thus making image dependent on our angle of vision. Our angle of vision is mediated by our own perspectives and the continual reflection on these in relation to our assumptions and beliefs as well as the finds of the research. This angle of vision may also be regarded as the interpretation of each dataset in relation to the research question and the method by which it was generated (Brannen, 2004). Guba and Lincoln (2005:208) suggest that this metaphor allows for

an interweaving of 'discovery, seeing, telling, storying and representation' demonstrating connectivity with an interweaving of processes throughout the control of quality in this study.

This study was conducted through a developing critical realist approach to mixed method case study research with an exploratory purpose. My understanding of the interconnectedness of social reality is in accord with its dynamic nature, therefore the findings and conclusions drawn outlined in the following chapters will expand the ocean upon which my odyssey continues rather than bringing me to the shore of completion.

Chapter 5: Data presentation and findings

*Experience is not what happens to a man;
it is what a man does with what happens to him*
Huxley

The main aim of this study was an exploration of the relationship of student epistemological beliefs with their learning on a Foundation degree. In this chapter I share the findings of this study. The focus reflects Yin's (2009) thinking about the purpose of case studies and the development of prior theoretical positions. Therefore, it is recognised the nature of the theoretical starting point of this research discussed in previous chapters has influenced and modified the research questions. My developing theoretical lens of critical realism has provided the filter through which I have viewed these data thus it is important for the reader to appreciate my positionality when engaging with my findings. This I have made clear in Chapter 2 where I presented a personal exploration of my own previously unchallenged assumptions and beliefs.

The multi-phase, mixed methods approach to this study explained in Chapter 4 is reflected now in the presentation of the data analysis. The iterative nature of the analysis developed in response to the change from sequentially equally weighted analysis in the initial stages to a dominance of the analysis of the interviews. This development reflects Onwuegbuzie and Combs (2010) stages of mixed data analysis where decisions were made during the course of the study and throughout the stages of analysis, which in turn raised further questions relating to the initial research questions. The evolution of the questions was developed through Phase 2 and 3 of the study (Figure 4.1) as:

Phase 1 research questions:

- 1 What beliefs do Foundation degree students hold about knowledge, learning and intelligence?
- 2 What is the relationship, if any, between students' epistemological beliefs and their engagement as a learner?

- 3 If feasible to ascertain these beliefs is it possible to develop strategies in the course content to enhance University experiences accordingly?

Phase 2 and 3 research questions:

- 4 Is it possible to ascertain any modification in epistemological beliefs over the course of a Foundation degree?
- 5 What are the implications of any change in beliefs over the Foundation degree?

The initial analysis of the data from the 3 phases moved the study on again and a further question emerged as the concept of transformation was revealed.

- 6 What is the relationship between students' change in epistemological beliefs and the occurrence of transformation?

This final question is considered together with an exploration of the literature relating to theory of transformation in the discussion chapter.

As has been explored in the review of the literature, the many studies regarding beliefs about knowing, knowledge and learning have provided a number of well-defined categories. The interview questions and the questionnaires were guided by this literature and in the first instance this theory-driven approach was used as a rubric to categorise the responses in analysis. The level of interaction between the two sets of data analyses reflects Teddlie and Tashakkori's (2009) iterative sequential mixed analysis whereby the independent analyses each provided an understanding which was then combined and integrated into meta-inferences of the epistemological beliefs of the students. The priority of the interviews was not ascertained before the implementation of the study but the dominance of the interview analysis emerged throughout the different phases of data collection and analysis. As recommended by Dalberg et al. (2010) in order to make this process of iterative analysis transparent the data analysis is organised into sections based on the type of data collected. Thus the analyses of the interviews are presented first to recognise their emergent dominance and are followed by questionnaire data, both providing convergent and divergent insights in to the research questions asked. The case study narratives are then presented exposing the meta-inferences drawn. The

interpretations of these findings are then discussed holistically addressing each research question in Chapter 6.

5.1 Interviews

The methods used for analysis are detailed in Chapter 4 and are only summarised here but I wish to emphasise a few points in terms of my approach to analysis. Hallden et al. (2007) suggests some researchers take limited account of the context and the co-construction of meaning in an interview situation with the assumption that what is said mirrors the interviewee's knowledge about an object or phenomenon. This is not an assumption that I made as I believe the meaning created is due to the interaction and joint construction of the interviewee and interviewer. Therefore, it is recognised here that the interviews with the participants in this study were 'active interactions between two people leading to negotiated, contextually based results' (Fontana and Frey, 2005:698). Whilst the semi-structured style of interview ensured key areas were discussed, it also allowed me the freedom to change the order and the emphasis thus facilitating a more conversational style (Fontana and Frey, 2000). This made it possible to develop a more relaxed relationship which enabled an exploration of concepts that some of the participants admitted to never having thought about before.

The focus of my analysis, as explained in the methodology chapter, was to identify common elements across the interviews in terms of the participants' epistemological beliefs thus attending to research questions 1, 2, 4 and 5. The interviews from Phase 1 were analysed for categories, first individually and then between interviews, in relation to the research questions using the adaptation of the constant comparison method. This method was then repeated for the second set of interviews from Phase 3. The categories and trends were then analysed for changes across time between the first interviews in Phase 1 and the second interviews in Phase 3, with the questionnaires providing additional understanding of the participants' beliefs.

I present the 5 participants, Emma, Liz, Maria, Rachael and Nicky, views about knowledge, knowing and learning as offered at the beginning and end of their Foundation degree. These views are presented in accordance to the categories related to knowledge, knowing and learning that arose from the data driven by the literature thus using a theory-driven approach to categorise the interviews. The

categories presented are: definitions of knowledge, provenance of knowledge, certainty of knowledge and simpleness of knowledge. This is followed by the presentation of the participants' views on the definition of learning, the speed of learning and the view of intelligence. The before and after views of the participants are presented together to demonstrate the change in beliefs about these constructs at the beginning of the Foundation degree and the end of the Foundation degree whilst at the same time, revealing the variety of views and changes associated with beliefs about knowing, knowledge and learning. In addition to these categories specifically about the participants' beliefs I also present other views that represent either a contextual aspect or that might expose reasons for the change that emerged, these are: previous learning experiences; reasons for doing a Foundation degree; and the social nature of the Foundation degree. These aspects are presented first as they provide the context for the beliefs that are then discussed. Throughout the participants' words are italicised.

5.1.1 Themes arising from the interviews

i. Contextual aspects

Previous learning experiences

Of the five participants four did not enjoy their school experience. Rachael was expelled from school with serious behaviour problems, Emma wanted to *get out* as soon as she could, Liz was *bored* and *created conflict*, and Maria felt she *didn't fit*. They also reflected that the time was not right for them in terms of learning as suggested by Liz: *you obviously don't understand at that age the importance of education*. Nicky enjoyed school but was offered a job when doing her A-levels and saw more potential in that opportunity so did not continue into higher education.

Reasons for doing a Foundation degree

All participants had a variety of motivations for beginning the Foundation degree. Notably there was a professional stimulation for all participants. Emma explained: *I am a manager of my setting so it was like "ah you need to go up"...I kind of knew I wanted to do something, wasn't quite sure what then this just felt like this all fell into place*. Rachel had recognised that *it didn't matter where I went, when I wanted to do in my job I was held back because I don't have a degree. So, I thought well let's play the game, get a degree, that's what they want, that's what I'll do*. Liz had already

begun professional development in her job and realised that she had begun to enjoy learning and perhaps echoed the thoughts of her colleagues when she declared *it's my time now*. Maria was strongly encouraged by her colleagues to begin the degree but it took two years for her to find the confidence. Nicky, Liz and Rachel explained they were also partly motivated by being potential role models for their children. All participants mentioned that the setup of the Foundation degree being one day a week taught sessions and work-based learning suited their jobs and family lives, allowing for flexible learning.

Social nature of learning on the Foundation degree

The social nature of learning was a key theme that emerged in both sets of interviews though understandably with more emphasis in the last interview as they had spent two years with each other by this point.

Initially the engagement with small group work which allowed interaction and exploration of embryonic ideas in a safe environment was a positive for all participants. Emma, for example, found the *whole community aspect beneficial and talking to other people that think the same, to actually have these discussions as debating points because for me makes me feel alive*. In the second interview the participants expand on the benefits of the support network established on the Foundation degree and describing a collaborative and supportive environment. Liz explains that *getting to know one another, getting to know one another's jobs, everybody feeding off one another giving people information, it's just been so supportive*. Maria also explores the benefit of variety of backgrounds of her colleagues as *to begin with I wasn't sure that the mix of everyone's different jobs and settings was going to work but I hadn't realised how much I could learn from someone else in, say, a secondary school setting*.

For Maria the social context not only helped develop her knowledge and understanding but also her self-belief as *talking with everyone made me realise I was OK, or I would be OK, and that my worries were not just my own. The support from everyone is so amazing...this is not what I was expecting*. Later she also reflects *I had so much baggage about learning, I guess, I know, left over from school...when a teacher says you will never amount to anything you kind of believe it...I couldn't have done this without [friends]*. Emma summarises this emotion by explaining *when people shut you down you then have these barriers and then you think you can't do*

it... the environment is a really key thing, thus drawing attention to the importance of social support facilitating beliefs about self as a learner.

There was also recognition of the broader nature of learning due to the contextual nature of the set up of the Foundation degree. As Emma reflects it enabled her *to put the context behind a lot of my learning, which is making it more seamless*. For example *using sociocultural theory...seeing that process, then going back and looking at how we work as a team*. Maria explained that *things began to make sense in school, I understand why so much more now and have even questioned the teachers*. Most notably she says *I feel part of the school now not just an add on*.

Throughout the discussions there were both implicit and explicit mention made of the sociocultural aspects and influences of the learning experiences of the participants. The discussions relating to the impact of context on learning clearly manifested itself from direct experience, both past and present. There is a suggestion when discussing their professional settings that there is an embedded knowledge that can be accessed. There was an emergent realisation by most of the participants that this knowledge could be challenged by justified experience or theory.

ii. Themes relating to knowledge, knowing and learning

Definitions of knowledge

In the first interviews all participants' initially related knowledge to facts either explicitly or implicitly. There were tacit assumptions that there is a certainty to knowledge, that it can be retrieved and therefore known. According to Maria *knowledge is what it is, it is knowledge of things...You need to know things to have knowledge of things, you need to be able to memorise facts. At school that was a lot of memorising and remembering facts*. Similarly to Liz *knowledge is something that can be got and that you build on...it's out there for you to get it, if you want to get it*. Rachael links knowledge to something that has been taught and admitted that before starting the course she would have said knowledge was fact but the first interview took place 4 weeks after the beginning of the degree and now believes they are not the same. However, throughout our discussion she still alludes to this notion that *knowledge could, is more likely to be encyclopaedia facts*. There is a suggestion also that there needs to be a motivation involved in personal knowledge. Nicky suggests

knowledge can be learnt if you want to learn that knowledge...if you're not interested you won't retain that knowledge.

Further into the first interview some participants gave a modified view linking knowledge to understanding, an action or creation. Nicky suggested there might be a constructive aspect to personal knowledge as *you have to look at several different things to create your own knowledge. Knowledge is probably your own opinion, maybe?* She also related knowledge to knowing as *to know something, to understand something, to take it on board to be able to talk about it... I think it's knowledge.* These discussions also suggested there was an internal as well as an external aspect to knowledge; this is further explored in Emma's descriptions of knowledge.

Emma's initial description of knowledge suggests a naïve belief but then develops into an emergent sophisticated personal frame: *knowledge to me is like anything...anyone can give you a piece of knowledge so you can just, you know, tell you something, just switch on, press that button, to do whatever, that can be knowledge.* She describes knowledge as *neither right nor wrong, it's, it's just that's what it is, just what it is, it's just knowledge, it's not good knowledge, it's not bad knowledge, it's just knowledge.* Emma continues by suggesting a surface level engagement with knowledge, as it *is not something I would not always necessarily retain.* She needs to *take it away to make into understanding which then for me becomes wisdom and truth... it becomes understanding which I think then gives you wisdom as opposed to just something that is demonstrating a deeper engagement with knowledge.*

It was apparent throughout all the first interviews that the concept of knowledge had not been considered in any depth before by the participants. There was an initial consensus that knowledge related to packages of information or facts in some way with the notion that knowledge needs to be mastered. During the actual interviews there was a shift for some participants towards a belief that there is an active engagement with knowledge relating to understanding and what it is to know. This notion of active engagement with knowledge, through the assessment of opinions, becomes more established in the second interviews which I now explore.

Rachael for example suggests that knowledge is *pretty useless unless you have a way of using it.* She relates knowledge to pieces of information but also to *an opinion*

that you formed over time. In relating knowledge to opinion she also differentiates between knowledge and a belief where *an opinion can be easily changed, whereas a belief is something that is more deep.* Maria also relates knowledge to information and the process of interaction and sense-making. Again Emma's own take on her understanding is evident as she still describes knowledge as *stuff. It's like, you can read a book, it's knowledge, it's just words on paper, it's just handouts, it's journals, it could be anything.* However she is quite adamant that for her there has to be an interaction: *I think you've got this knowledge and it's just there but I don't think it becomes proper understanding until you take it away and it becomes a truth for you.*

In the second interview some participants continue to relate knowledge to the notion of facts but then question their own understanding. For example Nicky challenges her own understanding of fact *I want to say the facts, but that's probably the wrong word...Because fact makes it sound like it is black against your white. An absolute, yes. I suppose you can have a fact, red is red, but then is it?...Yeah, I think the fact is the wrong word, perhaps information given, you can have information given but that will transcend into knowledge. But then probably I would think knowledge is more of the deeper understanding of the information now. Not the word fact, no, information may be.* This verbal reflection demonstrates the ability to challenge the notion of an absolute whilst still not quite ready to let go of the construct.

This notion of interaction leads to the view of the origin of knowledge and whether knowledge is derived from reason, experience, intuition or authority. These views open a window to the participants' ontological view of the nature of knowledge which then helped the exploration of what it is to know discussed below.

Origin of knowledge

Initially the participants differentiated between different kinds of knowledge and demonstrated a mixed belief in authority, experience and intuition as the origin of these different forms of knowledge describing different strategies to access this knowledge. Maria, Liz and Rachael suggest that knowledge can be given and that knowledge can emerge from experience. For Rachael knowledge comes from *life, from whatever pathway you choose to take...the most important, the first thing that would come to my mind would be experience.* Yet to know something for Rachael means *something that has been taught* inferring the provenance of knowledge also from an expert.

The notion that there is an expert as the master of knowledge, with teacher as expert, is mentioned by a number of participants but encapsulated by Rachael's comment in terms of assignments: *I'll learn about assignments, I'll learn how to play the game and give what people want.* However, as is shown in Rachael's case study, this view changed dramatically over the course of the degree. This also assumed by Maria as *I'll feel better once I've had the feedback from my first assignment telling me what I need to do to get better...tell me what to do and I'll try to do it* proposing a passing on of knowledge as *that is what the tutor's for, that's what they have trained for, to get that knowledge so they know what they are talking about.*

Knowledge also resides in different media for some. For Liz and Nicky reading is a key to knowledge acquisition suggesting a belief in an authority of knowledge as an acceptance of what is read, though Nicky does also mention the need to read *in between the lines and then taking that somewhere else on a tangent* signifying a rational engagement with the authoritative word. After further consideration Nicky also suggested that knowledge can be created through your own opinions derived from discussions with others suggesting a more sophisticated stance of the provenance of knowledge. Maria suggests that knowledge is *just out there and some things you just know, ready for you if you are willing to engage with it* suggesting an emotive, and possibly a motivational, connection to the knowledge whilst also proposing. The motivational aspect is apparent with Nicky who suggests knowledge comes from *wanting to know about something.*

Liz also suggests there is a primacy of certain knowledge *because it's been written way back in the day. So, you know, I can't really argue with what they've written, because obviously it has been written* but up-to-date knowledge is open to challenge. There is a strong suggestion from Liz that there is a belief in the authority of legislation and policy related to parts of her job: *I know the legislation on that area, you will do this, you have to do this, it is in the legislation.* However, she also suggests that she will challenge this authority if she has more knowledge about it herself.

Dialogue was also mentioned as important to knowledge acquisition both for receiving knowledge and creating knowledge. Liz, for example suggests *you can get more knowledge from other people* but then explains *you can get an understanding from someone else's stuff...putting together yourself and then making it something that you understand.*

Although Emma considers that *anyone can give you a piece of knowledge and you can learn from anyone and anything* and she also thinks *everyone can just teach you something, whatever that might be...by offering a pearl of wisdom... that you might find useful*. There is a suggestion that although some knowledge comes from authority it also has personal currency as *sometimes it just rings true to you straight away*. However she does not appear to be suggesting that these 'pearls' are accepted without thought or consideration as she considers there is an individual interaction to this knowledge: *I think it's almost like a cycle what becomes one person's wisdom is knowledge for another person until they make it their own wisdom*. There is still a suggestion of a confirmatory nature with the knowledge in terms of its provenance in authority as a mixture of belief in derivation: *Some of it's new, some of it's just crystallised...and some of it was just, you know, just confirming*. She describes a confirmation of the intuitive provenance of her knowledge as *some of it is instinctive decisions that I've made where I think this is the best way, but if you'd asked me why at that time I'm not sure what I would have said, but now I can say 'actually', you know!* This also transferred to her practice as Emma's understanding of her professional beliefs has begun to crystallise: *I want the children to learn through play and I think this is really important and then coming here has enabled me to crystallise why it's so important*.

There were strong views throughout the first interviews about experts, either as tutors or media resources as external sources, able to impart knowledge especially in the participants' new context of the Foundation degree. Whilst all participants suggested an engagement with different forms of knowledge there was an overriding suggestion that, although how we engage with the knowledge was our choice and dependant on experience, it was more to do with whether we agreed with the knowledge in relation to understanding rather than the knowledge being derived from reason, so demonstrating a more naïve view of the authority of knowledge. Implicit here is the notion that the present education system may perpetuate the view that individuals have to 'learn to play the game' to get qualifications.

Whilst intuition and personal experiences continued to be discussed during the second interviews there is a more of a suggestion of accessing internal sources through rational and analytical engagement. This was evident especially with knowledge relating to professional experience with an understanding of the need to link ideas and concepts to professional practice through to a contextual negotiation

and judgement of these ideas. Rachael describes the first step of linking of ideas gained from the taught session through a reflective approach to *link it to an incident in the classroom*.

There are suggestions of negotiated acceptance of knowledge from other sources as Rachael suggests taking a *handful of opinions, beliefs, theories, so then I suppose you would pick one that you would think be true but then that is what you believe*. Nicky has developed this understanding of the source of knowledge by suggesting *once those outside sources are probably in, there is probably another knowledge that probably does come from yourself, because you have a perspective on it and this is modified by weighing up the argument with one that you probably don't believe in and I suppose that would give you more of the layered knowledge*. This is a notion that Maria echoed as *you have to make a judgement about other people's opinions...should you accept it, does that sit with what you believe, does it make sense in your world?*

Whilst there is a clear sense of knowledge interaction and construction there is also the impression that knowledge starts from somewhere. For Nicky *probably it is some of what you have from outside sources, a catalyst...I've got that knowledge that's been written down by somebody else but then this is modified by inside knowledge of your opinions...that comes from your perception of may be reading something, listening to something*. To Nicky this means that the *knowledge that you construct is constructed in a personal way*. Liz also considers *you come with a certain understanding of your own knowledge and although you are able to be taught information and other knowledge that is around... adapt to it, and you've got to apply in your own circumstances*. The notion of interacting with the knowledge suggests a strong link to understanding from all participants, put by Liz as *knowledge, it's just an understanding, and I think you do need to understand it and it needs to be in practice, to see how it works for you*. Even though there has been a clear change in Liz's beliefs she will still use authority as a credible knowledge source to support her in her workplace by justifying her opinion with parents by saying *I can actually say research has shown this*. Nevertheless Liz recognises her own change in this belief and the contextual nature of knowledge as she is *not just taking their word for it* anymore.

The provenance of knowledge was naturally associated with the certainty of knowledge by the participants, and it is to this construct I now turn.

Certainty of knowledge

The notion of certain knowledge was very strong at the beginning of the course though in different measures from all participants, with some contradictory beliefs in the certainty and changing nature of knowledge. In many parts of the interviews the category of the certainty knowledge was intertwined with the notion of the simplicity of knowledge.

In the first set of interviews Liz alludes to the certainty of knowledge as she says *I will go and find out, so I know, so I know it*. She believes that *there are facts...knowledge facts where you say this is a fact and this is what happens*. Although Liz is ready to challenge received authority she will do this with a belief in the certainty of knowledge. However she questions her own knowledge alluding to an appreciation of the tentative nature of her use of knowledge. Emma demonstrates contrary beliefs in terms of the certainty of knowledge as *sometimes it just rings true to you straight away, so that's fine* but also believes that *everything has to stand up to questioning [because] if I'm really going to take this in and it's going to become part of the fabric of me it has to be something I'm behind 100%, it has to be something I can believe in*.

Rachael and Emma demonstrate a belief in the changing nature of knowledge but linked to personal life experiences. Emma considers: *things that I believed that had been truths for me when I was younger are different now totally from my life experiences...I think sometimes it can be just the fact that you change and therefore you begin to think differently*. Whilst Rachael acknowledges that knowledge may be tentative she recognises for herself that her default position is certainty and belief in knowledge. She says *I always know that there is a grey area, but also black-and-white. But I get confused; I do get unsure of everything. If somebody said to me 'fact or fiction' I would say fact first*. Even though there is this underlying belief in certain knowledge she admits she questions to challenge and is open to have her views changed.

Liz, Nicky and Maria suggest that the certainty of knowledge can be dependent on context and subject. Maria proposes that *it can change when new knowledge is found in subjects like science...but history the knowledge is always the same, it is what people think about it that changes*. Likewise Nicky considers in *maths...knowledge is fact, there's no getting away from it. But for something like*

sciences or something in education that there is none, 'cos you may think something, I may think something.

The tentative nature of knowledge for the individual is mentioned by Nicky as our own *personal knowledge changes more* and is reflected in Liz's comment *I think it's always changing otherwise you'll never get a better knowledge...for it to engage you for one, because the stuff I know now, the stuff I didn't know two years ago, and the stuff is out there that I will know the couple of years you know, but I don't know now.* This suggests a naïve view of the changing nature of knowledge, that it is not knowledge that changes but our awareness of it. The use of language here could have been explored in more depth at the time as some of these views appear to conflate learning with the changing nature of knowledge.

In the second interviews the notion of personal knowledge changing rather than the changing nature of knowledge is a recurrent theme. Developing her notion of outside sources of knowledge Nicky maintains that individual knowledge can change *the more you want to know about something.* Nicky also relates this to individual belief structure where *your beliefs could change the more you know about something, but the way that you look at it is always going to be looked at through your lens.* Nicky's notion of knowledge appears to have moved to a radical relativist perspective as she believes there could be multiple truths about the same thing *because it's what you perceive to be true...I couldn't say you was wrong, I couldn't say I was wrong.* Rachael also alludes to this relativist stance suggesting a tentative nature of knowledge when perceived by others *when you write something, somebody else interprets it the way they want to.* Rachael expands this thought and describes her understanding of the evolutionary nature of knowledge through our changing understanding of Vygotsky's work. Maria explains her development in understanding the uncertain nature of her own knowledge as *the hardest thing I had to overcome was to justify what I thought, I used to think that it meant I was wrong when you wrote that on my assignment...now I get it...it took a long time to realise that my opinion could be valid in amongst all these other ideas.*

There is a tacit assumption of the contextual nature of certain knowledge in terms of professional practice. Both Emma and Maria argue that those in authority are making decisions based *on their beliefs about the certainty of education.* Maria considers there should be *a better forum for challenge.*

The tentative nature of knowledge was conflated with the construct of simple and complex knowledge which is now discussed.

Simple knowledge

As already shown there was an initial belief from all participants that knowledge can be factual and unchanging. In the first interviews this was related to knowledge as small discrete packages such as Liz's view that we can have *bits of knowledge and some things...I will go and find out, so I know it*. However, there is inconsistency in this belief as participants also acknowledged a varying view of the complexity of knowledge. For example, Emma demonstrates a naïve view suggesting that if they taught certain things at school it would *have made life so much more simple*. But then continues by exploring the interrelated nature of knowledge in her professional capacity where we can *cut through everything and actually just pull out the important parts* as she wants to get *to the bit underneath and the understanding of why you're doing that, what made you behave in that way*. There is the suggestion from Nicky and Maria that knowledge is compartmentalised in schools. Whilst Nicky considers this as inappropriate, Maria considers this is helpful as it *makes learning uncomplicated*. However Maria admits later that whilst this might be uncomplicated *it doesn't help the learning 'cause the children can't see the links between the subjects*.

Liz and Nicky demonstrate an enrichment view of knowledge in terms of the simplistic building block approach where Nicky explains *you can have lots of little knowledge or knowing about little things but when...you want to know more, that's when you increase your knowledge of what you want to know*. She extends this view by suggesting an integrative aspect that *you have to look at several different things to create your own knowledge*.

Emma relates an understanding of the complexity of knowledge to life experiences and personal changes as *you change and therefore you begin to think differently*. She suggests that these changes may allow you to *go back and relook at that and think that 'actually that made sense at the time but now, from where I'm standing now, it's different', and then it's like another layer of the onion*, so alluding to the notion of conceptual change.

There is also an understanding of a complexity and interrelatedness of knowledge within the context of aspects of learning for the Foundation degree. In relation to learning theories Rachael declares that she can not understand *how one can be*

without another 'cause it is all of those things. She also explores a personal understanding of the complex nature of knowledge by acknowledging a frustration in the assumption of stereotypes perpetuated by statistics disclosing that *if I was to go by statistics that I would be in prison for knife crime.*

Throughout the second interviews there is a change towards both a tacit acknowledgment and specific appreciation of the complex nature of knowledge which is manifested through the interrelatedness of concepts and ideas. Emma expressed this notion as: *I'm beginning to feel it's like everything is linking up...this year I've seen like the threads coming through, I've seen my interests coming through, and my strengths coming through.*

Liz noticed the need for links in relation to the assignments on the course *whereas in the first year I just went 'oh yeah, I need to do that for the next one' but not actually linking it throughout.* This is also reflected in her professional practice where she has made links between the theory and practice to support her decisions. Maria also recognised the necessity to engage with the interrelatedness of knowledge *although it was hard to begin with as there was so much stuff to know and learn...it was hard to make sense of it all...it was easier to put it into boxes. Then I just saw connections everywhere, I am not sure when this happened but the links just emerged... that was confusing but really exciting and suddenly I was OK.* Emma relates the complexity of knowledge to understanding relating to the necessity to interact with knowledge as *you need to try it on a few times, you see what feels right and what doesn't feel right, you kind of match it with your own experiences and then, eventually, what you get left with, is like, is understanding*

Viewing the complexity of knowledge from a personal point of view Emma also recognises the interrelatedness of self as a learner that has developed since school-based learning as she concedes that she is not separate people but she is a learner in all aspects of her life. This notion leads us to the concept of learning.

Definition of learning

Initially most participants related learning to knowledge. Liz suggests a cycle where *I think you have to have knowledge to learn but I think you have to learn to get knowledge, which is really ridiculous, you know; it's a cycle, isn't it.* Liz also considers it important to *have some form of knowledge be able to think actually yeah I want to*

learn a bit more about that. Knowledge recognised as a commodity to have as a starting point for learning was also articulated by Nicky.

Some related learning to the acquisition of knowledge, such as Nicky who states that her *own personal learning is gaining knowledge* and that *learning is the facts and research* thus alluding to the realist notion of knowledge acquisition again. She continues by relating knowledge to facts as an entity but learning is more open to the process of understanding. Emma also suggests learning is *the process that you take the knowledge into understanding and wisdom.*

Others noted a relationship between learning and progression. Rachael suggests that it is the *ability to progress, the want to progress...wanting to move, change* so acknowledging an affective aspect to learning. Liz also considered progression as *learning means I'm bettering myself.*

The notion of context was important aspect of learning for Liz. She found that she enjoys learning now as it has meaning and she is able to apply it to her own context. The motivational aspect is also key for Liz as *sometimes you're just not ready and maybe never will be ready.* She explained *I'm not learning because I have to be at school and I have to be doing this... I'm learning this because I want to do it.* Motivation was echoed by Rachael as *some people are not prepared to learn, they're not prepared to listen, they're not prepared to change their comfort zone.* This latter idea alludes to the uncomfortable nature of learning at times.

There was an acknowledgement of academic learning as different to other learning for some participants. Rachael for example said prior to the degree she had *no idea about academic learning...very streetwise very, you know, life experience but not academic learning wise.* Importantly for Emma learning is a continuous process and *there is life learning that you can't do a classroom, and...learning is just what I do every day in a way.* Emma believes that learning is *universal because life teaches you things as well as just sitting in a classroom teaching you things.*

In the second set of interviews there was no suggestion of different kinds of learning as in the first interviews. The participants all alluded to the holistic nature of learning without differentiating between school, academic or life learning.

There was more thought given to the process of learning and its implications rather than the definition of the concept. According to Rachael *learning is the application of knowledge* whereas for Nicky *learning is gaining knowledge*. She expands on this by suggesting that *you would learn something to create the knowledge...and then the knowledge would be knowing that then applying*. Emma suggests *the learning is the process of interacting with [knowledge]... and moving forward and everything being that interaction, either with someone, with an environment, with a resource*. Maria suggested a primacy of learning as you have to be able to learn to gain knowledge but then concedes that there needs to be a starting point of knowledge, which then changes as you learn more.

Speed of learning

There is an acknowledgment in the first interviews that learning is a gradual and constant process. Emma links this process to the tentative nature of knowledge. Nicky also perceives learning as a gradual process as you can *find better ways to do things*, but she suggests a simpleness to the process as she thinks *you can learn something and then unlearn it because what you just learnt wasn't right anyway*. However to Maria the quick nature of learning is a necessary skill because *if you didn't get it the first time you get left behind*. Liz admitted to being intolerant of other learners who are not quick with their understanding. There is no perception of the gradual nature of learning or the complexity of knowledge as *I think while they've had it explained to them twice, and any more than that then you are confusing the people who already understand it*.

Rachael describes an affective side to the gradual nature of learning as the need to *change your comfort zone...it's wanting to move, change*. Rachael also describes an early change in her opinion of the speed of learning relating the concept to her professional life where rather than telling a group of students how to solve a problem she left them to resolve it. She recognised her beliefs had already changed as she admitted before the start of the Foundation degree she would have intervened earlier. The gradual nature of learning was reflected in all the second interviews. Emma feels empowered by this: *I know there's still so much that I don't know but rather than feeling 'oh my god that seems daunting' it feels good because I've got somewhere to go*. She again relates learning to a lifelong process as *its never-ending so there really is never going to be an endpoint*. The gradual process of learning was linked to

the interrelated notion of knowledge where the links and the understanding of these links take time to establish. Emma describes this as *beginning to feel it's like everything is linking up* where she can now see her *strengths coming through*. Maria also recognises the gradual nature of learning through self belief suggesting it was the perseverance she found that enabled her to achieve: *I began to believe in myself...passing the first assignment was amazing so I told myself to stick at it and it would come, and it did.*

Nicky describes how her learning was goal oriented as *in the beginning it was fixed as you read what you need to read from the given key text* but now it is more about *the run-up to it in a way that I always found far more enjoyable. The assignment is the end product... half the stuff I write is never submitted...but I think through writing it and reading different things*. She explains *I enjoy the learning of the whole area and other areas surrounding it rather than, I think at the beginning of the course you are just so het up on writing 3000 words or whatever*. Rachael also describes her learning was originally about *achieving that goal but it wasn't about the learning* and she states she *would have been happy getting Cs* but then she *started taking a few risks whereas before I would never have done that. And so you are like playing with yourself academically thinking no actually I'm going to try that, I'm going to try this and see what happens*. This change in attitude enabled Rachael to gain A grades in her work: *It's about looking up and knowing I can do this, this, this and that's my goal now, not the end, it's about the process*. She has taken this change into the work place as *quite often I find myself saying [to the children] persevere because this frustration that you're feeling right now will made you remember it when you do finally get there*. The notion that learning is gradual also moderated the participants' belief of intelligence.

View of intelligence

At the point of the first interview the participants admitted they had already started to change their views about intelligence. Most participants believe that there is more than one kind of intelligence. Emma for example thinks *people can be emotionally intelligent, I think they can be academically intelligent*. She defines intelligence as a *leaning that you have, something that you're good at* and Rachael added that intelligence is not measurable but no one is *more intelligent than anyone else* suggesting we all have our own intelligences as *that's your bit, and that's their bit, you're not less intelligent*.

Emma tussled with the malleable nature of intelligence unsure *how much you're born with and how much you're not*. Maria was more certain and suggested that *you are either clever or not clever*, whilst Liz believes that we are born *with a degree of intelligence* she is firm in her belief that intelligence is *something that is changeable...and something that can be learnt and can be taught*. This notion has developed because she explains *if I put myself back 10 years ago no way would I have thought I would be here...because I just wasn't that type, I wasn't into this at all*.

Both Emma and Liz suggest intelligence might be due to perception of others. As Liz suggests *people might perceive you as not being intelligent, when actually you might be intelligent, but you just not using it*. Emma also questions if *we then get cleverer or do we then just get better at expressing the cleverness that is already there*. Maria also alluded to this as she said *I didn't think I was clever, neither did anyone else, but [colleagues] seems to think I am which is why I am here*. Relating to this Emma suggests that your *environment can change it and is a really key thing* however the environment can also be a negative influence *if you're continually told you're stupid you begin to think you're stupid*.

In the second interviews there is the notion that hard work and effort can be linked to a perceived increase in intelligence. Rachael noticed that her grades started to improve after realising her hard work was paying off. She offers an honest reflection on her views:

I said to you before that I thought ability is changeable but actually I don't know whether I truly believed that...I was happy with the C and that's all I was ever going to get, so I think I was being a bit of a hypocrite actually...it is definitely changeable; my grades have gone up a bit. So it is changeable.

Rachael differentiates between ability and intelligence as *ability is something that you can apply your intelligence to, so I don't think the two could be separate*.

Liz continues in her belief that intelligence is changeable and suggests that motivation can affect intelligence. However it appears that she might be conflating intelligence with the ability to learn or with the increase in knowledge. She believes *you can learn intelligence...but I think people have got to want to learn it*. She continues: *you need to want it from the beginning in order to learn and then I think you do become more intelligent, because you're getting so much more information*. Liz also comments on the need for application *if you understand it and apply it, then I think it can make you*

more intelligent, because you're making the links yourself...you will gain more intelligence by doing that rather just sitting there.

In summary, there were a variety of views about knowledge and knowing at the beginning of the course. All participants changed from a more prevailing naïve view of beliefs about knowledge, knowing and learning to more sophisticated views in the two years of the degree. How knowledge was viewed became more complex and integrated with a need to actively engage with it. Initially all participants considered some knowledge was certain and that some knowledge could be derived from a source. Some participants also alluded to the tentative nature of knowledge as there was personal interaction to bring about understanding. These views were more secure by the end of the course where knowledge was consistently seen as complex and interrelated and derived from experience and reason. It should be noted that there were some contradictory views of knowledge throughout concerning all elements and it seemed to depend on the contextual nature of the knowledge set that the participant was considering whether they had more naïve or sophisticated views.

5.2 Questionnaires

The questionnaires in this study were used as measures to explore the participants' beliefs about knowledge, knowing and learning. Two questionnaires used were:

- i. The Epistemic Belief Inventory (EBI) (Schraw et al., 2002) (Appendix 3).
- ii. Implicit theories of intelligence scale: Beliefs About Intelligence (BAI) (Dweck, 2000) (Appendix 3)

5.2.1 The Epistemic Belief Inventory (EBI) analysis

The EBI is a 28 item, five point Likert-scaled questionnaire designed to elicit beliefs about simple knowledge, certain knowledge, omniscient knowledge, quick learning and fixed ability. The 36 participants were required to indicate their strength of agreement to a set of questions relating to these five categories. The questions were phrased according to the more naïve aspect of the belief represented by a low score and a high score in any of the categories indicated a more sophisticated view. The questions relating to each category and the possible scores are indicated as a reminder in Table 5.1.

	Simple	Certain	Omniscient	Quick	Fixed
Questions	1, 10, 11, 12, 17, 21, <u>22</u>	<u>2</u> , 18, 23, <u>28</u>	4, <u>6</u> , 7, <u>19</u> , 25, 26	3, 20, 27, 15, 9	5, 8, 13, 14, 16, 24
Lowest score = naïve viewpoint	7	4	6	5	6
Highest score = sophisticated viewpoint	35	20	30	25	30

Table 5.1 Epistemological beliefs represented by the EBI and possible scoring.

The questionnaire was completed twice by the 36 participants, firstly at the start of their Foundation degree (Phase 1) and again at the end of their first year of Foundation degree (Phase 2). The changes in the total point scores for each belief subset results from both data sets for each participant are shown in Table 5.2 where green indicates a change towards the sophisticated position, the red a change towards the naïve position and blue for no change taking place. The totals for all the participants' scores in each category are presented separately for Phase 1 and Phase 2 in Appendix 6. There is an overall positive change in the data in all categories over the year suggesting an increase in sophisticated beliefs with the biggest change being related to simple beliefs and the lowest relating to beliefs in the origin of knowledge.

	S	C	O	Q	A
	-1	0	0	-2	3
	1	2	2	-1	0
	0	-2	-1	-1	6
	-1	3	3	-1	6
	0	5	-2	0	2
	3	1	1	1	-3
	3	2	2	2	1
	-2	-1	-1	-1	-7
	-3	0	-4	-4	-4
	-6	0	-3	-3	2
	2	3	0	0	-1
	7	2	2	1	0
	3	0	4	3	-4
	8	1	0	9	5
	5	2	-1	6	4
	-2	1	0	6	1
	3	0	3	-3	1
	4	3	2	6	5
	-2	-1	-3	0	-2
	-3	-2	-5	-4	-7
	13	3	3	11	10
	0	-1	-4	-3	1
	4	1	0	3	1
	0	-2	4	-2	-3
	-5	-4	0	-2	-1
	3	0	1	2	2
	1	2	1	3	2
	6	3	1	3	-1
	5	1	0	3	-1
	-3	1	0	0	1
	5	2	1	2	1
	5	-1	2	-2	2
	5	5	2	5	0
	6	1	2	3	3
	5	0	6	2	2
	6	1	-3	2	-3
Total	75	31	15	44	24
Means	2.08	0.86	0.42	1.22	0.67

Table 5.2: The change in the point scores for each belief subset

The EBI and BAI are both standardised questionnaires as discussed in section 4.6.1. A paired t-test rather than a Wilcoxon test was undertaken to explore the significance of the changes in mean scores in the ‘before’ and ‘after’ data sets of these two questionnaires (Table 5.3; Appendix 8). Whilst not a standard test for ordinal data the parametric t-test is more powerful and therefore more sensitive and efficient at detecting slight differences in the means of such data. This is significant for this data

as the sample size was small giving less degrees of confidence. The parametric t-test has a set of assumptions where most must be met for effective use of this test. The data in this case met the assumptions for normally distributed data where means could be calculated indicating an appropriate usage. In addition there was not a significant difference in variance between the two samples. There were two nominal variables: one representing the individual participants and the other representing the 'before' and 'after' of the measurements of epistemological beliefs. For the simple category there is strong evidence to support the hypothesis that the mean difference is greater than zero (p-value=0.0025, 0.25%). This suggests that there is an improvement in the students' mean scores for simple knowledge. However the mean increase is small, as demonstrated by the mean increase being 2.08 on a score of 22.4 and by the confidence interval of the true mean being so close zero. There is also evidence, though not strong, for certain and quick categories and there is not significant evidence to support the hypothesis of an increase in mean scores for the omniscient and fixed category. Due to this relatively small potential increase in mean score it was decided that analysis of the actual changes between the 'before' and 'after' raw data may expose a better understanding of the data.

	Simple	Certain	Omniscient	Quick	Fixed
Total change in point score between Phase 1 and Phase 2	75	31	15	44	24
Mean increase in point score between Phase 1 and Phase 2	2.08	0.86	0.42	1.22	0.67
Paired t-test p-values	0.0025	0.01	ns	0.25	ns
95% Confidence intervals for the mean increase in point score	0.7385 to 3.4282	0.2033 to 1.519	-0.4175 to 1.2509	0.0277 to 2.4167	-0.5278 to 1.8609
Percentage increase in point score	5.95%	4.31%	1.40%	4.88%	2.23%

Table 5.3 Change in scores representing each belief subset from Phase 1 to Phase 2 of the study.

Breaking this data down into individual participants Figure 5.1 shows for each their total change in scores from Phase 1 to Phase 2. A positive number shows change towards a more sophisticated view and a negative number indicates a move towards a naïve view, and zero indicates no change. For some participants it can be seen there was a move towards more naïve beliefs but for the majority of participants, 27 out of 36, there was a move towards more sophisticated beliefs.

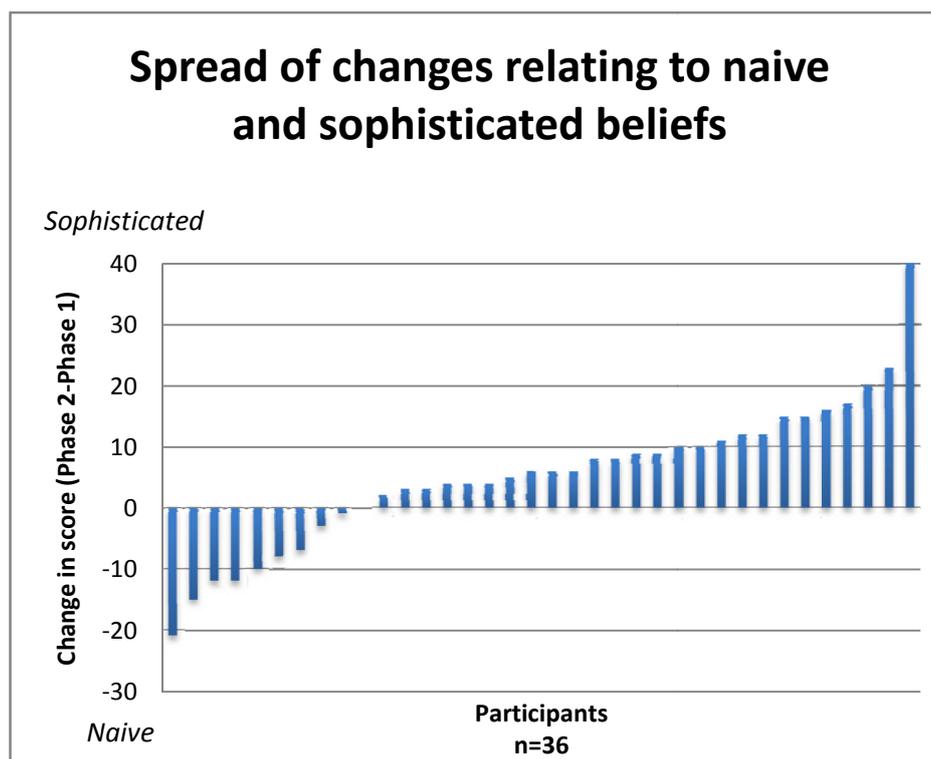


Figure 5.1 Amount of overall change relating to naïve and sophisticated beliefs in all categories.

This trend from naïve to sophisticated is reflected to different extents for each of the five categories (Appendix 7). For each category there was more of a change towards sophisticated beliefs for the cohort as a whole. The greatest changes occurring in the beliefs about simple knowledge and quick learning to a view where knowledge is seen as more complex and learning is gradual.

In terms of cohort percentage the participants who demonstrated a change towards sophisticated beliefs are shown in Table 5.4. Whilst the overall percentages demonstrate an holistic increase in all areas for the cohort the individual data for each participant displays inconsistent changes. These can be seen in Table 5.2 (and

Appendix 6 for the separate Phase 1 and Phase 2 data) where out of 36 participants, 14 indicated a positive or no change in all categories, 7 of these with only positive changes. However this left 22 participants with some negative change, including two participants with no positive changes at all.

	Simple	Certain	Omniscient	Quick	Fixed
Percentage of participants demonstrating change towards a sophisticated belief	64%	70%	54%	64%	64%

Table 5.4 Percentage change of participants towards sophisticated beliefs in all categories

More specifically out of those questions with the increase between 5-10% towards more sophisticated beliefs 6 questions went up by over 8%, being simple questions 10 and 17, certain question 2, quick questions 20 and 28 and fixed question 16 (Table 5.5).

	Simple	Certain	Omniscient	Quick	Fixed	Total
Between 5%-10% increase	6	2	1	2	1	12
Between 0%-5% increase	1	1	4	3	3	12
Between 0%-5% decrease	0	1	0	0	2	3
Between 5%-10% decrease	0	0	1	0	0	1

Table 5.5 Number of questions demonstrating an increase from naïve to more sophisticated views.

Figure 5.2 shows the changes of the 5 interview participants in the 5 categories. The simple category was the only one that demonstrated a change in all participants' beliefs from the naïve view that knowledge is simple to an understanding that knowledge is more complex. Emma and Rachael were the only participants who showed a move from more sophisticated views to a more naïve view in other subsets. Yet, as has been shown in the presentation of the findings from the interview and will be shown in their case study narratives, both participants clearly demonstrated sophisticated viewpoints over the range of beliefs about knowledge, knowing and learning. Possible reasons for these discrepancies are discussed in the next chapter.

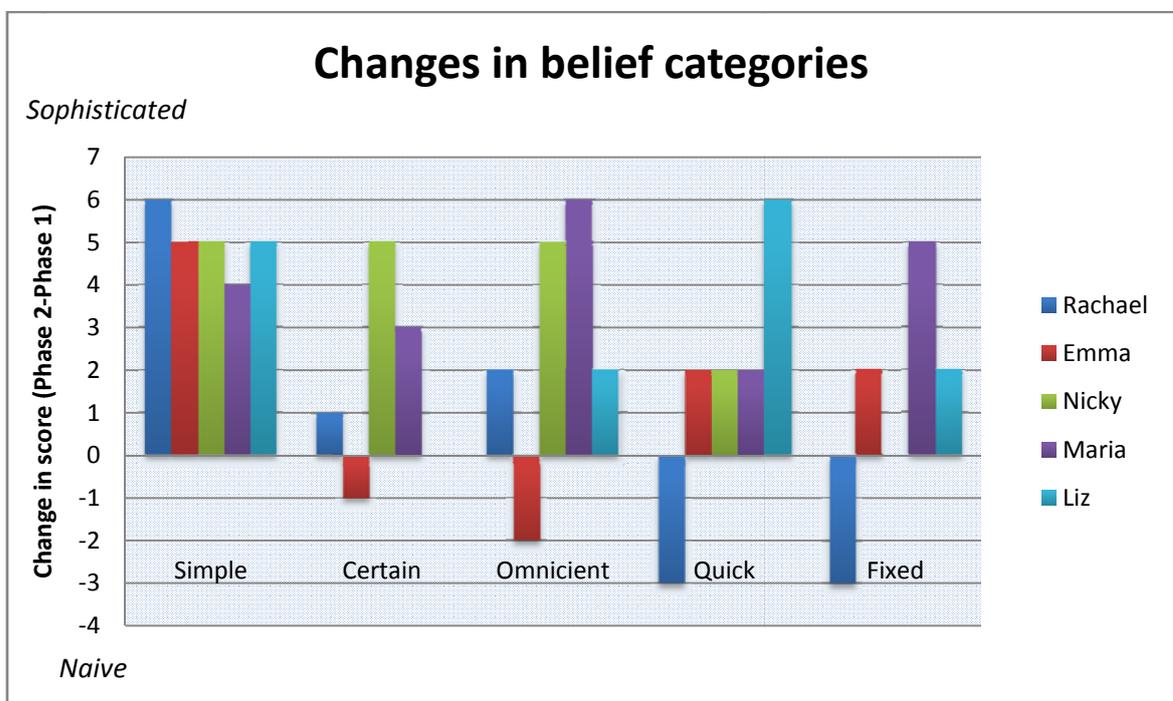


Figure 5.2 Change in beliefs of the 5 interview participants in the 5 categories

5.2.2 Beliefs About Intelligence (BAI) analysis

The BAI questionnaire indicated an increase in beliefs that intelligence was malleable and changeable for most participants (Figure 5.3). The participants at either end with the most changes towards more naïve or more sophisticated views correlated with their behaviours which manifested in the classroom.

The participant with the 11 point change towards a belief that intelligence is malleable started the course with very little self belief in her ability and pointed out her feeling of academic inadequacy frequently. However, she demonstrated determination throughout and took every opportunity to ask for help to enable her to progress. This saw a significant change in her assessment marks and her academic belief in herself to the point where she went from achieving 3rd class to 1st class marks for her assignments.

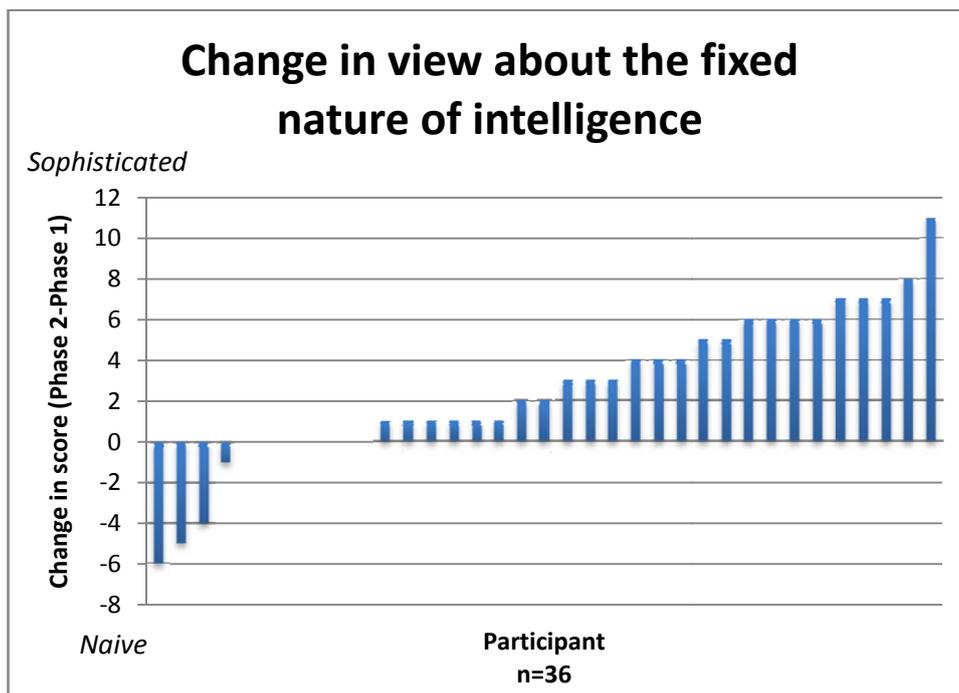


Figure 5.3 Amount of overall change relating naïve and sophisticated beliefs in fixed nature of intelligence.

Only 4 participants showed a change towards a belief in the fixed nature of intelligence. The 3 participants who demonstrated the most significant change also demonstrated a low self belief. However none of these participants made the effort to seek help in their learning, two of them actively avoiding offered tutorials.

It might be assumed that there would be similar results between this data and the category of fixed ability belief from the EBI as they are purported to be measuring the same construct. However, as shown in Table 5.6, this effect is not evident statistically (See Appendix 8 for t-test data). Reasons for this discrepancy are suggested in Chapter 6.

	EBI	BAI
Total change in point score between Phase 1 and Phase 2	24	90
Mean increase in point score between Phase 1 and Phase 2	0.67	2.5
Paired t-test p-values	ns	0.0005
95% Confidence intervals for the mean increase in point score	-0.5278 to 1.8609	1.2614 to 3.7385
Percentage increase in point score	2.23%	8.33%

Table 5.6 Change in scores from the BAI and the EBI representing belief in fixed ability

5.3 Case study narratives

The iterative nature of the analysis allowed an emergent understanding of a modification to the participants' belief structure and frame of reference through an openness to learning and an attitude of change readiness. These concepts sit within Mezirow's (1991; 2000) concept of transformation which has emerged through this analysis. The theme of transformation which arose from the data for all participants to varying degrees was significant. Whilst I consider transformation occurred for all participants Emma and Rachael's stories serve to highlight the significance of this transformation. Their individual stories are presented and explored for a situated meaning to their transformation. The narrative form of presentation highlights the concept in a more cohesive and coherent way and serves to emphasise the theory of transformation and its links to epistemological beliefs and conceptual change. I now present the case study stories of Emma and Rachael relating to the individual changes revealed through the interviews.

i. Emma's transformation

At school Emma felt she was *a square peg in a round hole* and left at 15 because *I wanted to get out as soon as I could*. Her impetus for change came from being made manager of an early years setting. She was enthusiastic about her enjoyment of the course from the outset stating *I really love it! I really enjoy what we do, and so far there isn't really anything that I haven't got my teeth into*. She reflects that if *I had reached this space I would have stayed on* [at school] but is aware that she *wasn't ready for it back then* noting that *you've got to have your life experiences in the meantime*. Emma explains the way of learning on the degree enabled her to look at learning differently as *it's the new, it's a different way of learning which I like, it's completely different to school, which I really like*. At the beginning of the course Emma was ready and open to change as *I kind of knew I wanted to do something, wasn't quite sure what and then it just felt like this all fell into place*. She was unsure of where it might take her but also said *it feels so right there has to be a reason why I'm here*. Emma's openness to change was significant in her journey.

Through this mindset Emma was already questioning her own beliefs and assumptions from the outset as *an opportunity to re-evaluate, everything that happens to you...there is that moment where you can go 'do my values still apply', do these truths, does this knowledge that I've held, is that still appropriate?* For Emma *everything that happens to you is an opportunity to learn something new*. She discussed personal and professional opportunities as the course had given her a real *purpose, like it's kind of refreshed everything. Each time I learn something its making me go back to my setting and making me look at things in a slightly different way*.

There is a strong impression of a transformation to Emma's belief in, and understanding of, herself throughout the degree. Reflecting back she described herself as *beginning the degree with no self identity*. Emma's school experience also affected her confidence especially as the Foundation degree is taught in her old secondary school. This brought back unpleasant memories for Emma: *I was quite nervous and coming back in, there was just everything, there was lots of stuff from being at school that I remembered...I felt about 12 again coming through some of these corridors...I just found I just couldn't think in that room. I found soon as I walked in I just could feel my brain shutting down*. In addition to this although Emma has a very supportive immediate family her several past experiences have undermined her confidence and belief in herself. She describes a critical period in her life where she moved from a supportive family environment and was thrust *into*

this totally different world and that was very challenging and abusive. Following this she was completely broken down and had to remake myself totally...it was like having to remake yourself from scratch all over again. This experience made her realise that she wasn't anymore the kind of person that I wanted to be...I was a pale fraction of the person that I was, and I wanted to get myself back. She believes that because her family was such a strong foundation she was able to rebuild herself. She also reveals that one of the reasons she is enjoying the course is because I think that's making me feel good about myself, that I'm actually feeling that I'm achieving. However, the challenge is still intimidating as she explains: you so want to do well and you know what you want to say and I always set myself really high goals. So putting all that together is a bit nerve wracking.

To assist in overcoming these barriers Emma found the environment of learning and the set up of the Foundation degree very supportive as a community of learners and as the opportunity to meet new people. She describes how the dialogue with her colleagues on the course makes her *feel alive...get really fired up and enthusiastic*. Her own mindset also presents a significant challenge to her barriers as Emma demonstrated a reflective stance from the outset enabled by her openness to learn. She began to challenge and question her own beliefs through an internal dialogue. Some elements allowed her to clarify and verify her own thoughts as *some instinctive decisions that I've made where I think this is the best way, but if you'd asked me why at that time I'm not sure what I would have said, but now I can say 'actually', you know! Some of it's new, some of it's just crystallised*. In other areas she has developed her ideas through a reflective process: *I have come across things where I gone 'I've never looked at that before' so that's new and that's when I've gone 'that actually really makes sense I need to go away and think about that'.*

Change happened slowly for Emma. She uses the metaphor of a journey without a destination with a positive and purposeful frame of mind:

After the first year it's like we've been on a journey and I know we've been on a journey but at the minute I'm not quite sure where I've gone. I know I've gone down this road and I know it looked pretty along the way, and you know, there's been a couple of bumps and you know I don't actually know where I'm at yet. I couldn't really see the destination or where it was taking me. Now suddenly it's like actually I'm beginning to I feel like that I'm beginning to see where I'm going a bit. Even if it's only the fact that I'm actually I can see that I'm different, and I can see perhaps where I'm different.

Emma reflects on the impact on herself and the change in her own identity. Her openness has allowed Emma to *redefine my opinions about things*. Her own

research on social identity has also influenced her as she says she recognises *what fires me up...getting to grips with who I am within all of this* and that *I'm becoming a little bit more comfortable in my own skin, having a bit more confidence in my own opinion*. She describes the change to herself as an integrated whole where *I'm a mum over here, I'm a practitioner over here, I'm a learner over here, and I'm a woman over here, and it's all come together. And I think it's kind of become part of my identity more, so I've kind of integrated as a bit more*.

There is recognition by Emma that beliefs inform who you are and what you do as illustrated in her views at the end of the course about research: *you can't take the identity out of the researcher, that's not to say that you can't be objective, but even what you are choosing to research in the first place is kind of the sum total of your life experiences up until that moment, because that's what's made you choose that*. She expands on this view reasoning that your beliefs cannot be different from your actions though she has only now become to realise this as *actually everything that I've done, the whole holistic picture has kind of brought me to the point where I'm sitting in this chair and I've got these set values, set beliefs*. She does not recognise in this new worldview that there might be a discrepancy between espoused beliefs and belief in action, however knowledge of Emma's academic and professional behaviours at the end of her degree would suggest there is not a divergence between her beliefs and actions.

Emma questions her motives for engaging in her area of education as something she *fell into* but has now *kind of fallen in love* with but wonders now if it ever was an unconscious choice as her unarticulated beliefs may have lead her there. She describes her choice now as a conscious understanding and belief in the *messages behind what they're doing*. However, she is careful to point out that in this new understanding she has *actually managed to hold onto myself in that as well, and hang onto my own ideas and also admits I've learnt so much about myself, just about what I think*. Throughout this discussion Emma rationalised the deep changes to self and attitudes to learning and knowledge recognising the place of informed and articulated choices. There is a feeling of these choices being made with integrity and contentment. Emma explains how she has developed *much more confidence* understanding that *you do need to find that space, don't you; where you kind of own yourself* thus developing her own self-authored, and possibly self-transformed, identity (Kegan, 2000).

Underpinning these transformations appears to be the changes to Emma's belief in her academic capacity as she has *is coming to terms with things like my own intelligence which I don't think I acknowledged before*. She explains she has *come out feeling I am an intelligent person, and actually there's nothing wrong with being a bit academic, and I think actually have shown I can be academic in the right environment*. She rightly feels *proud of myself* and attributes part of her success to *all the work I've put in* and says *I feel really good about that*. This journey has not been easy for Emma as when *I got to the end of the first year I was thinking oh my God, how much harder it is going to get*.

Emma's discovery of her own identity has also helped her in her professional capacity as she says: *I think I'm much more confident...I feel more professional, I feel like I have more understanding, I know where I'm going, I've got, I'm getting my identity together*. Emma details changes in her professional life having found transition from team member to team manager difficult where she found *you're not part of the team anymore, you're in a space by yourself*. This feeling of isolation was compounded by numerous issues in the work place where she felt she had been *ricocheting from one crisis to another and completely out of my depth and the course on top* brought her to a crisis point. However, she then describes that 4 weeks before the final interview (6 weeks before the end of the Foundation degree) *it suddenly all came, all beginning to, come together. I've been trying to keep up with my reflective diaries, which I've been beginning to see the process, which was helpful actually...I don't feel like I'm on the run anymore. I feel like I've suddenly gone 'phew, here I am, comfortable*. This new found confidence has encouraged her to join professional groups and forums relating to her area of practice in the understanding that *if you want to make a difference you've got to go out there and you've got to put yourself forward for it. I wouldn't have had the courage, or even thought that I would have had anything to offer, in order to do that before*.

These changes in Emma's identity I suggest are related to her changes in her beliefs about knowing, knowledge and learning. These changes were detailed in the previous section but the key aspects I summarise here. By the end of the degree Emma has begun to recognise her own reasoned authority in a professional capacity where she is happy to challenge the received view with reasoned support from her own understanding. Emma explores a change in her understanding of knowledge as it takes on a personal meaning in terms of her professional understanding through applying theory to practice. She recognises that she is *beginning to put the context*

behind a lot of my learning, which is kind of making it more seamless and I'm kind of feeling that I'm building this identity in it all. This demonstrates a reasoned relativist belief suggesting a contextual truth that drives realities.

This is a significant shift in her frame of reference as there was a suggestion in Emma's first discussions that she held quite radical relativist views where the subjective nature of knowledge was paramount with comments such as *because it's right or wrong for me I don't necessarily think that it has to be the same for other people... if knowledge and truth were the same it wouldn't fit for everybody, because there isn't one truth, there is a truth for everyone.* However, she has developed to a place where she explores dialogue through both heart and mind where an integration of context with theory is rationalised to give meaning and where her own positionality can be explored.

Emma summarises her engagement with the degree with a reflective account of what I suggest describes her gradual and powerful transformation:

The sum total of you, that is your personal truth, that is your unique wisdom, you know. Nobody else has got the same wisdom that I've got because they can't have, because they haven't lived my life, they haven't had my experiences, that's me...I think personal truth becomes your identity, it's what you believe in, it's where you're coming from, it's where your space is, you know? I kind of think now you've got to find space and you've got to stand in your own personal truth, and then you've got to act from that space, and interact from that space. That's what makes you the person you are, the practitioner you are, good, bad, indifferent, strengths, weaknesses, whatever, that's where you are. I think that's what I found is developing, I've been developing my personal truths through a learning, you know, through a process of learning that I wouldn't normally have done.

ii. Rachael's transformation

Rachael's time at school was not a positive experience. She was expelled due to serious behaviour problems which she considered *to be everybody else's problem*, however as she reflects *life, and maturity taught me otherwise.* Following a variety of experiences Rachael is now a single mother to two teenage children working as a higher level teaching assistant (HLTA) and a learning support assistant (LSA) in a secondary school setting. She realised that she was being held back without a degree in her job and decided to conform, *play the game, get a degree*, suggesting a compliance with the system, rather than resistance. There was also a professional impetus as she had observed the stagnant nature of teachers in school as they

standstill for what they need to do, they are a teacher and they stay, they don't progress, they don't move, they don't change, they don't flow, and I don't want to be like that. Rachael also wanted to be a good role model for her children as she now recognises *your education is so important* but believed she could not say that *without proof* and she had to *practice what I preach*. She chose the Foundation degree due to financial considerations and its accessibility in terms of working and family life. Nevertheless she was self deprecating proclaiming *it's not something that somebody like me does*. She was also conscious that she *had no idea about academic learning* but she was *very streetwise... life experience but not academic learning wise*. She feels a *little bit resentful that I have to catch up 39 years in two, you know. And had I have had a little bit of a push educationally, a little bit of respect towards learning in school, then maybe I wouldn't have struggled quite so hard. But then this wouldn't have been half as much fun!*

Rachael admits to *sometimes I think(ing) I'm a blank slate* so tutors could tell her what they wanted as she did not have *any preconceptions about learning, writing because I've never been taught*. This is clearly not a thought that Rachael continued to maintain but it made her reflect on her background and she wonders where she would be if she *had good parenting, and had I had some understanding teachers at school*. Rachael demonstrates her strength of character here when she declares that she did not *hold onto that because I wouldn't be anywhere without that and I certainly wouldn't be here*. Nevertheless she admits *it does make you really think and reflect on you personally and ask I wonder what?*

Rachael began the course wanting to work with children in care homes; this has now changed to more open ideas such as *work in the prison service, or the youth offending or SENCo eventually, or OfSTED where a door will open and it will raise some sort of question and I'll go 'that's what I need to do'*. She seems content in this gradual change explaining *I'm getting there, I say I'm waiting for a door but I think they're slowly opening*.

As with Emma the notion of the community and the discussions that can arise from the cohesive nature in the Foundation degree context is recognised by Rachael in terms of her own learning and her workplace. Professionally she began to realise *the importance of every single one of my team, the LSA'S at work*. Discussions are central to Rachael's way of learning *I can't learn if someone just talks to me. I really struggle, I like discussions..., it just reinforces it because I done something with it, if I*

can ask a question or question it or back it up some way verbally then it seems to give it something to hold onto.

Rachael has experienced immense change personally, professionally and academically throughout her time on the Foundation degree. Much of the change, as with Emma, appeared to be due to the willingness and openness to change which brought about a transformation in her frame of reference. Rachael's determination was evident from the outset because even though she doubted herself she again raised the notion of game playing and an omniscient authority relating to the need for compliance in assignments. However, Rachael explored the need for motivation to learn and the capacity to be open to change as *the ability to progress, the want to progress...it's wanting to move, change.*

A shift in Rachael's self-belief throughout the course is also central to her discussions. She describes a background that forms a basis for her lack of self-belief and her low self-esteem which has acted as a barrier throughout her life. It took her until she was 27 to acknowledge *what I considered to be normal wasn't normal, and it was a huge shock when somebody actually sat me down and said 'no you're not doing this anymore, that's enough. You're killing yourself girl'.*

Rachael describes herself as a *shifting paradigm* in terms of her modified ideas about knowledge. She began the course with what she calls *black and white views* and *took what she read as true*. She acknowledged that there may not be a certainty to knowledge but also recognises in herself that her default position is certainty and belief in knowledge, whereas now her mind has *just opened up completely*. These views began to change within the first few weeks of the course with a developing understanding that knowledge is not certain and simple. She began to challenge authority and certainty when experience told her otherwise. Rachael links the notion of changing knowledge as a personal change linked to experience; life experiences change so knowledge changes with an impression of an understanding of the complexity of knowledge through a personal application. She also suggests at the end of the degree that there is an evolutionary nature to knowledge that is dependent on how we interact with it, where knowledge is tentative and created according to context. She alludes to a relativist view suggesting different people will interpret and construct own knowledge dependant on context. Rachael's change in beliefs about knowledge and knowing are explored in more detail in the cross-sectional analysis of all the participants.

These changes in her belief structures have reflected a perspective transformation that has manifested itself in different aspects of Rachael's life. In her professional role Rachael has changed as she has become *much more confident in the job role*. But it goes beyond confidence as she sees herself as having knowledge and authority in this knowledge as she is able to *talk with the teachers; I know what they're talking about*, allowing entry into the professional discourse. She was also able to give advice to a student teacher feeling *I had grounds to say it, whereas I've always taught at the school but I don't think I had grounds to say anything*. She questions whether *if you know your stuff, do you need to prove that academically* and whilst she suggests not she considers *it's given me that confidence to be able to, in practice*. However, Rachael is aware that it has made her more *critical which has given me more of a negative outlook on my job, to some degree*. She now prefers her HLTA role with the responsibility it comes with rather than the support role of LSA.

Part of this shift in confidence has come from an understanding of wider theoretical knowledge which Rachael has *been able to link to my own learning especially Dweck; I really engaged with that, I loved it because I could link it. Dewey as well*. Rachael raises a pertinent point and reflects whether *I would have done it naturally without knowing that I was doing it, and knowing that you are doing it just puts another few steps in the way* demonstrating a conscious change in her perspective.

Rachael sees herself as a hard-working, reflective learner. Reflection has been a significant aspect in her development *I love reflection. I don't quite understand how it really works...There is something about reflection that, just talking to you now I'm reflecting all the time and that's why I was looking forward to it because I knew I could take that and think actually I've done this, this and this...if I were to take one thing and take it to a career it would be reflection*. Rachael's reflective stance became quite noticeable in the second interview as she took her time to answer questions and questioned the meaning or intention of the questions.

Whilst Rachael's transformation seemed gradual in many respects there was a series of significant moments that culminated in what could be termed epochal for Rachael. This began for Rachael with the realisation that she had dyslexia when she first started working at the secondary school with the thought *hang on I thought everyone was like me, and no they're not*. However her dyslexia was only confirmed when she started the Foundation degree; this occurred after the first interview. From the outset Rachael did not see the dyslexia as an insurmountable barrier but rather as

something she could now understand and manage to help her achieve. She embraced the personal and technological support she was offered. She does not focus on her dyslexia but does eventually admit that *it is hard work. I struggle because it does take me a lot longer to do something than anyone else. It's huge, the impact it has on me.* Also of note is that Rachael writes her *reflective journals often about dyslexia.*

Following her diagnosis Rachael describes the changes in her approach to learning from product to process driven: *If I got a poor grade and failed something, great, because I'd made a mistake and I dipped a grade, that's not a problem, it's all my learning.* She relates this to an understanding of Dweck's motivational theories underpinning this change in belief structure *realising that that hard work could pay off.* This occurred following the completion of her dyslexia support training when *I came to terms with everything, thought this is the way that I think, so be it, and I got my confidence there. And then my grades started to improve after realising that, yes, this hard work is paying off.* She admits prior to this her grades stayed the same as she put in the same amount of effort. She admits to fooling herself that she happy with the C but understands now this was because this was all she thought herself capable of. So now she believes that ability is *definitely changeable.* Rachael also makes a link to Dewey's ideas and says she learnt that it is *about looking up and knowing I can do this, this, this and that's my goal now, not the end, it's about the process.*

A critical moment came when Rachael achieved her first A grade for an assignment. She reflects on this moment in terms of her self-belief: *I was so upset, and I don't know why, I was so upset. It was that moment of 'I can do this actually, I can do this, it's hard but I can do it'... it was almost like it popped my bubble, you know, it's very odd, I can't explain it.* She said explored her thoughts in her reflective diary and explained:

...it was almost like a belief had gone but I couldn't say what it was... my self-belief had been challenged...but it felt like a grieving process. It felt like I was grieving for the fact that I struggled with dyslexia all my life, you know I've only just started learning, and all of that protective bubble, so to speak, of dyslexia had been removed, and that's how it felt. It was a grieving process.

At the time Rachael was taking a module on special educational needs and the discussions had raised the point that *disability needn't be an impairment.* This moment was epochal for Rachael as she declared: *I don't feel like I'm held back by it for the first time ever.* A critical moment in Rachael's transformation.

Following this change Rachael continues to question herself but reasons this is a positive shift as before she just accepted that her self-esteem and therefore her capabilities were low. She admits to putting *barriers up but, you know, they are coming down...and that deep inside I believe that, that is the hard work. However there is still that bit of me that thinks that's a fluke.* She considers herself at a crossroads where she is challenging this notion and *counteracted it with taking risks... whereas before I would never have done that.* There is clearly still an element of disbelief in the grades Rachael is attaining due to the enduring influence of low self-esteem. It is evident she is continuing to push her own boundaries outside her comfort zone as she admits to competing with herself as she describes *playing with yourself academically thinking no actually I'm going to try that, I'm going to try this and see what happens.* Her openness and willingness to change is manifested in this approach thus enabling self development and transformation.

Rachael recognises her changing levels of self-confidence and self-belief as she acknowledges at the outset of the degree she *wasn't brave enough to take those risks;* but she looks *forward to taking those risks now.* For example, she relates a time when she did not agree with the underpinning rationale of Piaget's notion of equilibrium because she believed *if you challenge, if someone doesn't give you the answer, you don't challenge yourself to go find it, you just give up.* However when I, as her tutor, did not give a direct answer one of her questions but placed the thought back with her she describes how she became angry and *went home and spent another four days researching.* This made her realise that perhaps Piaget's notion was a valid way of learning but more importantly she had developed the confidence to push her own boundaries. She considers this a significant moment for her as she had *not believed in the state of equilibrium* before.

When reflecting on her changes she finds it hard to articulate: *I have changed, but I couldn't say I've changed this, this, and this, but I know it.* Rachael differentiates between her conception of beliefs and opinions. She considers her beliefs have not changed but she now is aware of *a realisation that actually, yeah, I do actually believe that.* For example she remembers admitting that *ability is changeable* but now wonders *whether I truly believed that... I always knew it, but I don't know if I truly believed it.* However she believes she has *probably changed my opinion to do with learning as a whole... but not consciously I don't think.* She also realised that her perception of game playing in relation to attaining her degree had also changed as she was *not so much playing the game as there's a lot to be got out of it.* In terms of

the degree Rachael believes *the amount of time I put to it, I've paid a heavy price* she also declares that she *wouldn't change a thing...as that's the sacrifice I'm prepared to make.*

Through both of these narratives and the cross-sectional analysis of all the participants similarities and relationships emerge. In terms of beliefs about knowledge and knowing there is a fundamental **change in the use of knowledge**, often relating to a change in use of knowledge about the self. **New ways of thinking about knowledge** are exhibited by all with an understanding that **knowledge is provisional**, that it may be complex and is often contextual. **Knowledge is seen to take on personal meaning** in the meaning making process and it is understood through active rather than passive engagement. This is related to beliefs about learning where learning is seen as a progression influenced by intrinsic motivation and effort. It was through all these changes that transformational characteristics emerged with an indication of the change in the frame of reference for the participants. Whilst change was anticipated in the participants' belief structures the depth and influence of change that emerged was found to be remarkable and of great significance for the individuals. I have tried to capture the transformational change in the narratives of Emma and Rachael. These points are discussed in detail in the following discussion chapter.

The analysis of the data reveals commonalities in themes relating to beliefs about knowledge, knowing and learning whilst also appearing to expose discrepancies within and across data sets. These issues are now discussed in Chapter 6 alongside my interpretation of the data so exploring the significance and implications of the data in relation to the research questions.

Chapter 6: Discussion

*So if knowledge and truth were the same it wouldn't fit for everybody,
because there isn't one truth, there is a truth for everyone.*

Emma

This chapter takes an holistic view of the research questions 1, 2, and 4 and addresses them by first exploring the beliefs held by the students and the modification of these beliefs over the course of their Foundation degree. Throughout the relationship between their beliefs and their engagement as a learner is considered. I then address the theory of transformational learning that has emerged from this study in relation to the changes experienced by the students, thus attending to question 6. The focus is initially on the outcomes from the 5 participant interviews. These outcomes are then drawn together with the rest of the cohort. Question 3 and 5 which relate to implications for change and future developments are addressed in the conclusion, Chapter 7.

6.1 Students' epistemological beliefs and change in these beliefs (Questions 1 and 4)

A sustained or consistent collective worldview did not emerge for any of the participants in this study from either dataset, so I do not present a unitary perspective but offer three belief **stances** *absolutist*, *multiplist* and *evaluativist*, which emerged and can be applied to all the categories of beliefs explored in this study (Table 6.1). Although epistemological beliefs may be seen as a collective worldview by some (Schraw and Olafson, 2003) the Foundation degree students' epistemological beliefs in this study did not present themselves as consistent or as unitary beliefs that could be applied with reliability in all contexts. Hammer and Elby (2002) maintain that using categories such as relativist or realist which imply beliefs as having a unitary ontology is misguided especially when individuals, as was the case in this study, have a mix of beliefs that exhibit naïve to sophisticated positions that were activated depending on the domain, context or question asked. Whilst recognising the relationship, I purposely chose language that does not represent ontological perspectives as I wished to avoid the conflation of such views with epistemological beliefs.

Absolutist	Multiplist	Evaluativist
Knowledge has an external source and can be acquired Knowledge is right or wrong; Truths are absolute Passive engagement with knowledge Learning is quick Belief in a fixed ability	Knowledge is subjectively generated All opinions have validity Limited analysis of evidence Reliance on feelings Personal experience is dominant	Knowledge is constructed and supported by evidence; Knowledge is a judgement which can be evaluated Knowledge is tentative and flexible Opinions are reasoned Active engagement with knowledge Learning is gradual Belief in a malleable ability
<ul style="list-style-type: none"> • Dualism (Perry, 1970) • Received knowing (Belenky et al., 1986) • Absolute knowing (Baxter Magolda, 1992) • Realist/absolutist (Kuhn and Weinstock, 2002) • Objectivism (Brownlee et al., 2009) 	<ul style="list-style-type: none"> • Multiplism/Relativism (Perry, 1970) • Transitional/Independent (Baxter Magolda, 1992) • Multiplist (Kuhn and Weinstock, 2002) • Subjectivism (Brownlee et al., 2009) 	<ul style="list-style-type: none"> • Commitment (Perry, 1970) • Contextual (Baxter Magolda, 1992) • Evaluativist (Kuhn and Weinstock, 2002) • Evaluativism (Brownlee et al., 2009)

Table 6.1 Epistemological belief stances

Table 6.1 presents descriptors for each stance and comparable terms from the literature which indicates how these stances may manifest themselves in terms of the different epistemological beliefs. It will be noted that the terms used to represent the stances correspond to the terminology used by Kuhn and Weinstock (2002). However, it is important to make it clear that I do not see these stances as developmental in that one must precede the next but they are independent stances that might relate to the different belief structures. The range of naïve to sophisticated beliefs held by the students across the different categories concur with Schommer's

(1993) view that knowing and knowledge are multidimensional rather than stage like. It is these more or less sophisticated beliefs about the different epistemological beliefs that give rise to an evaluativist stance, and more or less naïve beliefs that give rise to an absolutist stance. The multiplist stance is seen as mid way by some (e.g. Brownlee et al., 2009; Kuhn and Weinstock, 2002) but, depending on the context and domain in question, these beliefs were seen as *either* sophisticated or naïve. To present these three stances as a continuum would assume that sophisticated stance is most desirable, however as I later argue, in different domains and contexts sophisticated is not necessarily the most constructive to learning. Therefore multiplist does not necessarily sit within a linear relationship from naïve to sophisticated but offers a different stance. Indeed from a relativist perspective a multiplist stance may be viewed as sophisticated, and from a realist perspective it may be viewed as naïve. Each stance might be present in an individual's belief structure depending on the domain and context (Figure 6.1).

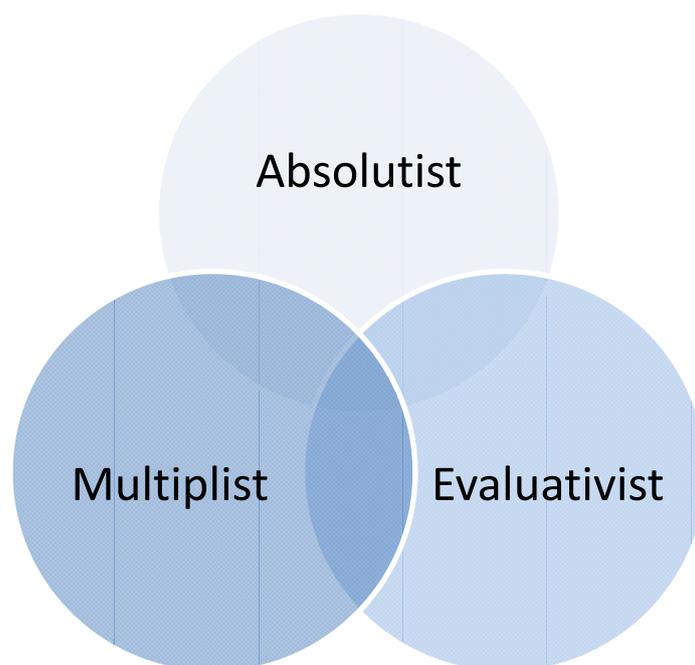


Figure 6.1 Possible mix of belief stances

It was apparent from the interviews that none of the participants fitted neatly into any of the stances either at the beginning of their Foundation degree or at the end but rather demonstrated a mixed belief system throughout with tendencies towards different stances. At different times the interviewees demonstrated stronger

allegiance to one or the other with an absolutist stance being more prevalent at the beginning of their degree to an emergent and tangible evaluativist stance at the end of their degree. This study is consistent in part with other studies relating to higher education in that as the students began their studies their views reflected epistemologies that were generally more naïve in nature and demonstrated a belief in the simplicity and certainty of knowledge with authorities often as the source of this knowledge.

For example, Emma, who exhibits mixed naïve and sophisticated beliefs, demonstrates both an absolute stance and a multiplist stance at the beginning of the degree suggesting an almost radical relativist view of truth. She describes a passivity to the reception of knowledge, but she also indicates for it to have meaning there needs to be an active and personal adaptation and engagement with this knowledge suggesting all opinions are valid. At the end of the degree Emma moderated her notion of truth continuing with consideration of other people's opinions but not a complete belief in the subjectivity of knowledge but a negotiated understanding based on reason.

The recognition of the constructed nature of knowledge moving to the point of a radical relativist position is noted in other studies (Baxter Magolda, 1992; Belenky et al., 1986; Kitchener and King, 1981; Kuhn, 1999); Olsen et al., (2011) observe in their study that this occurred during the second year of higher education. This would appear to be a similar development with the case study participants in this study apart from Emma who started the degree with a multiplist stance in some beliefs areas. Emma, Rachael and Maria's worldview certainly appeared to shift to a more consistent evaluativist stance, with Liz and Nicky indicating a context dependant evaluativist stance.

Not only did the participants exhibit a mix of naïve and sophisticated beliefs across the different epistemological belief structures, but they also exhibited both naïve and sophisticated views in the same belief when reflecting on different contexts such as their own academic learning and their professional practice; thus reflecting Pajares's (1996) 'messy belief system'. Whilst this might suggest an inconstancy it does not mean these are incompatible as it can be explained as an individual being in a different expert place in a particular domain. This supports the argument here, and by others (Buehl et al., 2002; Buehl and Alexander, 2006; Muis et al., 2006), that there are domain-specific aspects of personal epistemological beliefs. Liz, for

example, demonstrated the most allegiance to received absolute truths in terms of her understanding knowledge as facts and that knowledge can be bestowed, relating this to her professional role to support her argument. However, she also suggests that she is willing to challenge the view of authority in this respect if she believes in her own opinion. She does not explain any kind of judgement being made at this point based on reason. Whilst this might suggest her views sit more easily with the received absolute truth of a realist perspective rather than the evaluativist view of a relativist perspective, there is clearly a mixed perspective here.

The participants also offered different views of the certainty of knowledge reflecting on their own academic learning on the Foundation degree in comparison to knowledge in life learning and experience relating to practice; these views were generally conflated and became more sophisticated over the course of the two years. Rachael demonstrated inconsistencies in her beliefs about the certainty and simplicity of knowledge with her notion of 'playing the game'. Yet when applying her understanding to her own life Rachael is convinced of the complexity of knowledge as she declares she does not fit in to the boxes made by society. This inconsistency between academic sources of knowledge and what might be called life-based sources of knowledge may be a manifestation of our primary and secondary education culture with testing at the heart of a product driven system. However, in the second interview Rachael reflects the thoughts of Liz and Maria as she recognises the change in her beliefs saying she originally believed her learning was about *achieving that goal but it wasn't about the learning... that's my goal now, not the end, it's about the process*. Feucht and Bendixen's (2010) suggestion that school experiences might influence the domain-specific beliefs is reflected in the participants' comments in this study. Muis et al. (2006) suggest we need a better perception of this academic domain knowledge to further our understanding of the role of domain-specific beliefs in personal epistemological beliefs.

i. The sophisticated nature of epistemological beliefs

As alluded to earlier it is not recognised in this study that a sophisticated stance is always the most desirable for effective learning, rather it is dependent on the domain and context of learning. Each belief structure may be described as naïve or sophisticated in terms of how the belief manifests itself relating to the concept of domain. It is understandable that the move from naïve beliefs, that manifest as undisputed acceptance of knowledge that is certain and simple, to a sophisticated

understanding, that there are multiple perspectives and these can be acknowledged through a reasoned engagement with an understanding of the tentative nature and complexity of knowledge, that as educators we would wish for our students to develop their belief structures thus. As Brownlee (2001) notes this development is important where flexibility and reasoned interpretations are required in our pluralistic society and it is seen as more desirable to be able to engage critically with the knowledge in a particular domain of learning to advance understanding and create new ideas. Indeed the notion of criticality is portrayed by the Quality Assurance Agency for Higher Education (2007) as highly desirable in higher education. However, I remain cognisant of Elby and Hammer's (2001) caution raised in the literature review that we must challenge the notion of blanket generalisations about sophistication of epistemological beliefs and that it is the context of knowledge application that should affect our attitude towards the beliefs of that knowledge (Bromme et al., 2010).

Nicky, for example, suggests there needs to be a starting point for knowledge accepting that knowledge, as information, should be given. Whilst initially the participants considered that knowledge could be gained there was then a description of the need to make a judgement about knowledge as an interactive process of learning. Maria mediates this view with a suggestion that there perhaps has to be an *acceptance to begin with as a starting point to knowledge for you to begin to engage with it*. Acknowledging that we sometimes have to start somewhere and we do not make up all our own knowledge, does not suggest there is a blind acceptance but more of an acceptance of some forms of knowledge from credible sources that are then mediated by our own understanding and experience in practice. Relying on others does not mean less sophisticated beliefs as long as judgements are being made about these knowledge claims by what Bromme et al. (2010) call the division of cognitive labour. Therefore, there is a shift in emphasis from the cumulation of unrelated pieces of information to process of development of understanding where knowledge takes on personal meaning (Entwistle, 2007). This shift in progression towards more sophisticated beliefs where knowledge is a negotiated construct through experience and reasoning is seen as emergent at the end of the second year.

Our knowledge, and therefore beliefs and assumptions about knowledge, start from somewhere; they do not emerge from a vacuum. It is from this starting point that we can then accept, challenge or build on these ideas. So whilst there might be an initial naïvety in the engagement with certain and simple views offered by authority it does not necessarily mean that we have a realist worldview but perhaps a realist stance at

a particular point in our understanding. Contemporary educational theory supports and promotes the concept of constructivism and the advantages of interaction with the environment (Olsen, 2011) but, as noted by Hammer and Elby (2002), to construct our own knowledge we need raw material and an underlying structure of productive resources. Therefore, the implication of a naïve engagement with knowledge by some of the participants may indeed be an initial acceptance of knowledge from credible authorities when first engaging with a new area but then will be modified as the understanding grows demonstrating a more sophisticated world view underpinned by evaluativist principles.

ii. Beliefs about learning

I draw the elements discussed relating to the learning under the headings of process and product where, in summary, process relates to the meaning making through analysis and judgements of different perspectives to develop understanding and product relates to meaning derived from an aggregation of information with little interaction. These positions are not presented as a dichotomy but rather as different stances described by all participants at some point in the interviews relating to their understanding of, and engagement with, learning, sometimes presenting both views of learning at the same time depending on context of the discussion. The view that learning was related to the use or collection of facts or that learning happened in school is what Säljö (1979) calls 'learning taken for granted'. This understanding of learning changed by the end of the degree; then it was primarily seen as a 'thematic activity' generating a view of lifelong learning (Säljö, 1979).

The gradual nature of learning was recognised in the conflation of academic learning with lifelong learning. Initially life learning was seen as continuous whereas academic learning was very specialised with an understanding that you had to learn how to learn academically whereas life learning came naturally. Academic learning was also linked to professional learning; as the participants started to make the links between theory and practice this became more pronounced. Being able to relate their learning to their professional context seemed of utmost importance to the development of their knowledge and understanding and their learning of how theory relates to practice. There was a transformation of knowledge for some as the theory was translated into new and personal meaning in their practice with deeper connection at conceptual level. The active role of this application demonstrated the influence of making these links which then perpetuated the necessity of being open to

new ideas and challenging the expert opinion. Learning in these instances brought about a change in perspective as links were made to prior knowledge (Brownlee et al., 2009).

The capacity of negotiated knowledge discussed earlier is also more prevalent alongside what could be suggested for most participants, if not all, an increase in self-belief and an acknowledgement in self-identity. Motivation was a key aspect of learning that was recognised as a necessity to either begin learning or indeed to continue learning. This notion was linked to the uncomfortable nature of learning with appreciation of the effort needed when outside one's own comfort zone. Motivation for learning was also linked to the gradual nature of learning and the tentative nature of knowledge characterised by a change in self-belief as belief in the capacity to learn through perseverance became an attribute. These features were linked to aspects of self-belief which are explored in Rachael and Emma's case studies.

Thus if the nature of epistemological beliefs about knowledge and knowing are complex, multidimensional, multilayered and interactive as Buehl and Alexander (2006) suggest, and has been shown so far in this study, then the suggestion that there can be a single developmental model that addresses this complex variability is misleading. Epistemological beliefs are generative in nature and may be activated and flexible in different contexts (Bromme et al., 2010). I suggest that Bromme et al., (2010) notion of epistemological judgement, where beliefs can complement or compensate each other, relates to my classification of epistemological stances as a non-linear relationship.

iii. Beliefs as demonstrated by the whole cohort

The analysis of the 'before' and 'after' data from both questionnaires indicated a shift towards more sophisticated beliefs in all categories. In terms of change in point scores from the whole cohort the highest increase was seen in the simple category indicating a move towards a belief that knowledge is complex. The smallest change was in beliefs regarding omniscient authority but the data still suggested a move away from the belief that knowledge is derived from authority. The individual participant data also indicated the smallest change in omniscient beliefs but there was the greatest number of participants who changed their beliefs from the certainty of knowledge towards the tentative nature of knowledge. However, whilst this set of data showed 14 participants demonstrated either positive or a mix of positive and no

change across the categories there were still 22 participants who indicated a negative change in one or more of the categories.

There is an overall shift towards an evaluativist stance demonstrating more sophisticated beliefs in all the different categories from the questionnaires. However, I suggest the significance of this is not conclusive as further analysis between the interview data and the two sets of questionnaire data revealed inconsistencies. These will now be discussed.

6.2 An examination of the inconsistencies in the data

Firstly I would like to address the apparent inconsistencies between, and within, the interview data and the questionnaire data whereby these non-convergent findings are plausibly explained (Teddlie and Tashakkori 2009). In a number of places the participants expressed beliefs in their interviews that appeared inconsistent with their questionnaire responses. These inconsistencies may be due to several reasons. Firstly, the participants from the whole cohort may not have reflected on their worldview previously or having thought in any depth about their understanding about knowledge, knowing and learning. The very act of thinking about these beliefs in a conscious way may start to modify them as the participants tussled with the meaning and implications on themselves. The interviews appeared to have been the first time the participants have been asked to articulate their beliefs and ideas about knowledge and knowing to anyone. This previous lack of thought about these beliefs may have also raised uncertainty as they began to explore these ideas possibly for the first time. Vandenberghe (2009) proposes that language should be conceived of as a 'causal power' which suggests that by using language that was formerly un-used could engage a causal power and therefore a generative mechanism. Moreover epistemology can be a complex idea because it is self-refereeing; it is not often people challenge how they know what they know or what they actually mean, it is therefore hard for them to use the language to discuss this matter.

Certainly some struggled to communicate their understanding clearly and used the interview as a time to reflect on their understanding as their ideas about certain constructs which changed during the course of the discussion. I was mindful that the participants were not passive subjects in this research and therefore at some level had an active engagement so were constructing meaning during the discussion therefore influencing the research. This process was especially apparent in Rachael

and Nicky's articulation of their views during the discussion. Others made mention of their thoughts since the first interview. To help elucidate these understandings some instances were returned to and clarification of meaning was sought through another question. This allowed some of the participants to have time to reflect on their beliefs whilst remaining aware that a potential lack of shared understanding between interviewer and interviewee can raise or perpetuate inconsistencies.

It was also important to be aware that some of the responses held particular nuances that were not easily reducible to single concepts, such as the initial discussions about knowledge. As Egbo (2005:269) posits we recognise meaning making as an 'individual and context mediated process' rather than seeing it in absolute terms. In the second discussions these inconsistencies were less apparent as the content of the questions were familiar. Also the content of the degree may be enabled them to reflect on these beliefs.

The category of 'knowledge is certain' conceptualised from the naïve perspective as unchanging to a more sophisticated view of the ever-changing nature of knowledge presented some data of note. This is a key category as beliefs about the certainty of knowledge might be considered as a key dimension of personal epistemological beliefs (Hofer, 2002; Schommer, 1990). Feucht and Bendixen's (2010) suggestion that participants might have high score on certainty on Likert-scales instruments but that interviews might give a more nuanced view of the participants beliefs was reflected in this study. Three of the questions relating to this dimension from the questionnaires were in the top four highest responses in Phase 1 with the fourth question at the eighth highest response. This pattern was reflected in the Phase 2 questionnaires with all 4 questions appearing in the top seven. More participants indicated a change towards the belief that knowledge is tentative than any other category. These high scores indicate a strong sense of sophistication in this dimension which was not consistently reflected in the interview data, particularly in the first set of discussions where there were particularly naïve views of the certainty of knowledge.

There were a variety of beliefs relating to the concept of intelligence in the interviews and an inconsistency relating to this construct from the questionnaires. The use of language possibly served to complicate this understanding as the term 'intelligence' was discussed in the interviews and used in the BAI but the term 'smart' was used in the EBI. The BAI indicted the greatest increase in point score at 8.33% across both

questionnaires. Yet the equivalent category on the EBI, fixed ability, only showed a 2.23% increase demonstrating a much lower change towards a sophisticated stance. Rachael, for example, demonstrated an increased sophisticated viewpoint relating the malleable nature of intelligence on the BAI scale but a move towards a more naïve view on the EBI. The reason for this could be the use of language but also the concept of intelligence was ill-defined. There was more conflation of terms such as ability and increase in knowledge in the interviews. By having different understandings and use of terminology of a construct means it is not possible to compare one participant's view with another in terms of the holistic nature of the data set. Therefore, it is not realistic to make claims based on analysis of the before and after data set as it is apparent from the interviews with the 5 participants that their views had changed in terms of defining intelligence.

This uncertainty in language relating to the intelligence serves to highlight other possible inconsistencies in language. Although the questions were revised by Schraw et al. (2002) and again in this study to ensure a reduction of ambiguity it is apparent that ambiguity still existed for the participants in this study. Using the example of the beliefs about certainty, agreement with a statement that knowledge is certain does not mean there is a similar understanding of knowledge or certainty for all participants. This was made known to me by informal conversations with the cohort of students as well as inconsistencies that arose from the data. This highlighted that any belief is informed by the individual's underlying concept but this cannot always be made known to the interpreter of these beliefs and indeed are not always known to the individual.

Other discrepancies included beliefs about authority, which by all measures indicated the least change in this belief. However, as was discussed in the interviews, there is a clear acknowledgment that whilst some knowledge may be handed down from authority most now is constructed through reason. The interviews obviously allow an exploration of views whereas the questionnaires supposedly give a snapshot of beliefs at a given time. The 5-level scale is too narrow to allow the nuances of these beliefs to be exposed but as has been shown it is also in doubt whether they also show a true reflection of the participants' belief structures. Furthermore although a negative change is indicated there may be a positive awareness in the construct where the certainty of their beliefs is in question. Therefore, whilst the questionnaires clearly indicate the participants' beliefs I question how representative the data is of their true beliefs.

6.3 Links between beliefs about learning and epistemological beliefs **(Question 2)**

Attending to the second research question this small case study reflects the view that changes in beliefs about knowledge and knowing are interconnected and relational to changes in the beliefs about learning. This observation is drawn from the interviews. When participants described learning as a product they saw learning as the acquisition of knowledge. This was related to attainment in assignments in the first interviews demonstrating an integrated understanding though passive acceptance of the relationship between knowledge and learning. More credence was given to expert knowledge at the beginning of the degree which is understandable, however this was married to a suggestion from some that they had little to offer. There was an initial understanding that learning needed to be quick with the notion that if they did not understand it meant they were not 'academic enough'. It became apparent that this thought probably emanated from the exam culture in previous school experiences. This belief in the speed of learning was moderated by the participants' belief in intelligence as the discussions also revealed that being 'clever' or having 'academic intelligence' was a necessity exposing a belief in the fixed nature of intelligence. However, there was also recognition that learning was related to progression.

Although there were continued references to the speed of learning in the second set of interviews direct reference to learning as a product was only recognised in the first set of the interviews; yet what we do and what we believe we should do for effective learning is not always the same. There were explicit discussions on the trial and error nature of learning relating to the analysis and synthesis of multiple sources of knowledge. This was related to achievement and attainment in module assessments which, for all, were articulated as a process towards a developed understanding. However, it is interesting to note that although these views were strongly articulated in the discussions outside the interview scenario these espoused beliefs were not always acknowledged when submitting assessments. Sometimes to get through assessments, as Rachael noted by playing the game, accepting it is not real learning but common sense that overtakes theorising. Therefore is there a conflict between the reward, assignment grades in this case, and developing an epistemological stance that can be related to deeper understanding. As Elby and Hammer (2001:559) suggest agreement with 'being a good student generally involves memorizing facts' is considered a naïve response but actually may be given by a student with sophisticated beliefs who understands that memorising facts may

achieve higher grades in assessment. This discrepancy was revealed by some of the participants by their espoused beliefs and enacted beliefs in their assessment. However, it appeared that the greater the move towards an holistic evaluative stance this discrepancy became less as the participants valued the process of learning more. Some demonstrated a developing evaluativist position where truth can be constructed through reason and may be context dependant but this is recognised and rationalised. However, rather than being stage like development these views would appear to be the product of the personal sociocultural environment. Perhaps there is always an element of naïvety in our beliefs, and therefore an attendance to the absolutist position, as we are introduced to new knowledge and begin our mastery of this.

Changes in beliefs about the certainty and simplicity of knowledge led to a renegotiated relationship with knowledge which manifested itself in the learning capacity of the participants. The absolutist stances expressed at the beginning of the degree were associated with an understanding that knowledge has a certainty and this certainty can be obtained through expert authority. This passive engagement with knowledge was also reflected in the initial acceptance that there was a fixed element to their ability so learning was not a gradual process but rather a belief of you have either got it or not. The evaluativist stances later expressed were associated with the notion of learning as a process whereby there was an intention to make meaning with the recognition of the need to critically evaluate information to aid understanding and inform opinion. At the end of the Foundation degree it was interesting to note that there was no mention of learning as a product yet some participants still voiced commitment to an absolutist epistemological stance when discussing beliefs about knowing in relation to authority.

These changes allowed the students to become more confident with the changing nature of knowledge with an understanding of the place they began to own in terms of their interaction with others and themselves academically and professionally. The emerging evaluativist stance could be seen in a commitment to their own beliefs supported by critical argument. This epistemological change, as will be discussed, is significant for conceptual change and is a key to lifelong learning. This proposed mechanism for change will be discussed in the next section with a focus on Rachael and Emma's stories.

6.4 The entwined nature of epistemological beliefs, conceptual change and transformative learning (*Question 6*)

I now explore the relationship between epistemological beliefs and the theory of transformation so attending to research question 6. Firstly I contextualise this relationship by clarifying the association with conceptual change.

i. Epistemological beliefs and conceptual change

The focus of this study was about changes to student's beliefs about the nature of knowledge and knowing. The conceptual changes experienced by the students on the Foundation degree relating to teaching and learning clearly are intricately entwined as the contextual basis for this change to occur. Moreover it was apparent that the conceptual change was more than just a cognitive process demonstrating a relationship with epistemological beliefs (Deissler, 2008; Dweck, 2000; Pintrich et al., 1993; Qian and Alvermann, 2000). As epistemological beliefs are influenced by, and in turn influence, beliefs about knowledge, intelligence and learning the link to conceptual change is understandable and was shown by the participants who developed more sophisticated views about knowledge and learning were more likely to be open to new ideas. According to Vosniadou (2007b) a learning environment that promotes metaconceptual awareness and intentionality is central to conceptual change. This is the environment reported by the 5 participants.

The shift in the participants' subjectivity with a repositioning of the self alongside an extension in the use of language leading to a transformed view of the subject was explored in the previous section. This may be seen in terms of an engagement with Meyer and Land's (2006:374) 'threshold concepts' bringing about a new or previously inaccessible way of thinking. The uncertainty which is tolerated in passing through the portal of threshold concepts is akin to a developing evaluativist stance. By adopting a recursive approach to what has been learned it was acknowledged by the participants that learning was not about the quickness of learning but an engagement with the complexity and tentative nature of knowledge.

Drawing on Entwistle's (2007) discussions and the analysis of the literature on conceptual change presented in Chapter 3 to the findings that emerged from the data four key changes associated with modification of epistemological beliefs become apparent. Whilst stated earlier as outcomes from the analysis I reiterate them here

due to their significance. They are: **knowledge is provisional; a change in ways of thinking about knowledge; a change in the individual's use of knowledge;** and, **knowledge takes on personal meaning.** Also significant these were all facilitated by the conditions of **change readiness** and **openness to learn** exhibited to a greater or lesser extent by all participants. The openness and change readiness displayed by the participants, demonstrated clearly in Emma and Rachael's narratives, enabled them to overcome their low self-efficacy. Bath and Smith (2009) also show that openness is positively linked to academic achievement and job performance, and those with high self-efficacy are more likely to engage in lifelong learning thus linking with the important predictors of lifelong learning openness and epistemological beliefs structures. Furthermore corresponding to Meyer and Land's (2006) threshold concepts for conceptual change these key changes are recognised to be: transformative; irreversible, though a state of liminality may be felt; integrative; bounded for some and occasionally troublesome.

Conceptual change relates to change in epistemological beliefs which relates directly to a change in worldview. The epistemological beliefs then mediate the conceptual change within a knowledge discipline. The four key changes associated with modification of epistemological beliefs together with the notion of Meyer and Land's threshold concepts began to highlight the conditions of transformation for these participants.

ii. Epistemological beliefs and transformational learning

Transformation occurred through the change in the use of knowledge and the ways of thinking about learning. The significance of transformative learning theory emerged from the data therefore it was not explored in the literature review. It is not my intention to review the literature fully here; instead I draw on the pertinent aspects and refer the reader to the works of Mezirow (1991; 2000) and Kegan (2000) for a more fulsome exploration. According to Mezirow (2000:8) transformative learning occurs as we learn to negotiate and act upon our own values, following a reflective, open and discriminating stance rather than following those we have uncritically disseminated from others so gaining 'greater control over our lives and socially responsible, clear-thinking decision makers'. All five participants demonstrated, to varying degrees, a shift in their deeply rooted frames of reference to a better understanding of their individual beliefs and assumptions (King, 2004; Taylor, 2008) which, in terms of their

change in epistemological beliefs, was significant. Indeed as Kegan (2000) posits epistemological belief change is at the heart of transformative learning.

A 'frame of reference' is the 'meaning perspective, the structure of assumptions and expectations through which we filter sense impressions' (Mezirow, 2000:16). Kegan (2000) maintains that a frame of reference is a way of knowing, therefore describing one's personal epistemological beliefs. The participants' frame of reference was their context for, and the result of, making meaning and how they interpreted their experiences, and is the total of their assumptions, values and beliefs informing a lens through which they view both themselves and the world. Frames of reference were transformed by reformulating these reified structures of meaning through critically reflecting on their assumptions and context. This reformulation was observed through the four key changes presented above allowing a transformation of the participants meaning perspectives. This is related to Baxter Magolda's (2004:31) understanding as she explains 'epistemological transformation is a shift to a more complex set of epistemological assumptions rather than the acquisition of particular learning strategies or skills'. Thus it can be seen that epistemological changes are central to transformation where 'we change the very form by which we are making our meaning' (Kegan, 2000:53).

The learning was also seen as transformational for the participants because it became more than informational learning. Kegan (2000) highlights this difference where information learning is increasing a fund of knowledge or set of skills into an existing frame of reference so enhancing existing way of knowing whereas transformational learning incorporates this change of knowledge into a change in a frame of reference alongside an increased capacity. Informational learning and transformational learning are both necessary at different times but each has different value and merit according to the learning moment or context (Kegan, 2000). Information learning was experienced throughout the degree by the participants. It is recognised as a naïve mindset for some participants yet, as has been argued, this naïve view of knowledge acquisition is perhaps necessary for future understanding and a possible prerequisite to sophisticated learning to enable a critical perspective to develop.

Kegan (2000) describes two processes at the heart of transformative learning, both of which were experienced by the participants. The first process by which we shape meaning out of our experiences is what Kegan calls meaning forming. The second

process Kegan calls reforming our meaning forming which is a metaprocess that changes our form that is our epistemology. The knowing that gives rise to our beliefs and assumptions transform from external, often unknown, acceptance to internal authority which we are responsible for. The unarticulated to the articulated beliefs are revealed throughout the discussions. However, Mezirow (2000) states that transformative learning demands awareness of how we come to know our knowledge and values lead us to these perspectives. I argue that to ask adult learners to take a step back from their own assumptions and beliefs calls for recognition of these in the first place. In Emma and Rachael's transformation explicit awareness was not initially present. However, in both of their narratives there was the suggestion that it was the immersion in the new learning context that began to challenge their current beliefs not the explicit or conscious confrontation of these beliefs at the outset. This possible tacit awareness corresponds to the notion that our frames of reference may be both within and outside of our awareness (Mezirow, 2000; Taylor, 2007). Those outside our awareness can arise from an affective and repetitive relationship with experience, interactions outside of consciousness and learning that is unintentionally assimilated from the micro and macro culture (Mezirow, 2000). This was certainly exposed in the participants' exploration of previous learning experiences. Reflecting and engaging with these beliefs exposed a position of conflict as they attempted to reconcile what they believed, how they came to have these beliefs and the implications on their actions, if indeed they were mirrored in their actions, thus leading the participants to a set of complex challenges.

It is apparent in both Emma and Rachael's stories that the development of responsible agency was impeded by the conformity that was fostered by 'cultural canon, socioeconomic structures, ideologies and beliefs' about themselves (Mezirow (2000:8). This relates to Kegan's (2000) socialised mind where there is a tendency to uncritically internalise the values and expectations of our surround. Transformation is an evolutionary model experienced by Emma and Rachael as the shift from the socialised mind to developing internal authority with recognition of their own self-authored belief system to a transformed mind by allowing them to negotiate and act on these meanings and values to gain greater control and responsibility of their lives (Mezirow, 2000; Kegan, 2000). The latter stage can be likened to the final stages in the other models such as constructed knowing (Belenky et al., 1986) or contextual knowing (Baxter Magolda, 1992) or indeed the evaluativist stance in this study. However, Kegan and Miller (2003 in Brock, 2010) propose that the self-transforming mind seldom occurs until after graduation. This was not the case for a number of the

participants in this study, highlighted by Emma and Rachael, whose changes in their beliefs about knowledge and knowing impacted on their meaning perspectives giving them a transformed frame of reference through which they viewed the world, so equating with Kegan's (2000) self-transforming mind. Specifically this is noted in Emma's reflection about the transformation of her own identity through an explicit engagement with the theoretical literature enabled her to *redefine my opinions about things*. Although Kegan argues that changes in confidence, self perception, motives, self-esteem, important that they are, can all occur within existing frame of reference without transformation taking place, I argue, in the case of Emma and Rachael, the personal changes relating to self belief and identity of self occurred with the transformation of their frames of reference.

Although this shift is recognised in the discussions I remain unconvinced that these shifts or the implications were always obvious to the participants. Whilst I argue that they recognised the transformation as manifested in the outcome of changed personal and professional behaviours, they did not necessarily articulate this as an understanding of the development towards a transformed epistemology. Also transformation may not be articulated or even recognised as such until after transformation has taken place. So whilst a change was accepted the possible implications of these changes are not necessarily realised due to the complexity of epistemological beliefs both at a conceptual and theoretical level. Therefore the lack of articulation, I would suggest, does not negate the power of transformation but as practitioners we need to be more aware of the power of the process and what explicit engagement can bring to our learning or to that of our students.

The observed transformation can be related to two elements of Mezirow's (1978) ten phases of meaning: that of a disorientating dilemma and critical reflection. Indeed Taylor (2007) found in a review of studies engaging in transformative learning that the key elements are a disorienting dilemma as a catalyst for change followed by critical reflection. It is these two elements of transformative learning that I now focus on. Mezirow (1991) maintains that transformative learning always begins with a disorienting dilemma, and can be the result of a personal crisis or disaster. It would appear that Rachael experienced such a critical event when coming to terms with her dyslexia as a shift in her self-identity. However, this disorientating dilemma may not always be epochal as Mezirow describes but as King (2000) suggests adult learners may experience dramatic changes in their professional perspectives during professional education courses where the transformational change is only recognised

at a later date. This disorientation may have been felt by the participants commencing the Foundation degree as all 5 participants revealed that embarking on such a degree took them out of their perceived comfort zone. Considering some of their previous learning experiences this may have also been a critical moment for them. Indeed for Emma this appears to be a key moment for her but her following transformations appear to be more gradual. Therefore, for these participants a disorienting dilemma was seen to be triggered by a critical incident or major life transition, but also to have resulted from an accumulation of transformations in meaning schemes over a period of time (Brock, 2010).

The reflective process and dialogue were also central aspects for the facilitation of transformative learning; both of these are established practices throughout the Foundation degree. The importance of dialogue featured in all discussions as a key aspect in learning, and whilst the notion of critical reflection was not always discussed in the interviews there was a tacit acknowledgement of the reflective process with both Emma and Rachael making explicit their engagement with the reflective process.

Mezirow (1995:46) defines critical reflection as 'a process by which we attempt to justify our beliefs, either by rationally examining assumptions, often in response to intuitively becoming aware that something is wrong with the result of our thought, challenging its validity through discourse with others of differing viewpoints and arriving at the best informed judgement.' Critical reflection can be both explicit, that is analysing that which was previously implicit and uncritically accepted through challenging and critically interrogating the premise of assumptions, or implicit, which takes place within a taken for granted set of assumptions 'as when we mindlessly choose between good and evil because of our assimilated values' (Mezirow, 1998:186). Effective critical reflection is a difficult process to engage with; this has been apparent to me with students on various degree courses both at undergraduate and postgraduate level, and has been an issue raised at many end of year course evaluations on the Foundation degree. This may be because there is a generous assumption that adult learners have the ability of critical reflection but this may not be the case as most adults have not developed a critical capacity to reflect on their own, or others, underlying assumptions (Belenky and Stanton, 2000; Taylor, 2007).

Reflective discourse is a key mechanism for critical reflection but an area of note is the presumption of equality of participants in this process. As Belenky and Stanton (2000) point out, often these relationships are asymmetrical and the reality of

inequality is not always recognised. Indeed this power relationship was exposed in the participants' initial acceptance of authority as an unquestionable expert source of knowledge. Belenky and Stanton strongly advocate the need to recognise and embrace the voices of marginalised people in empowering them with the belief that they have the authority to question and challenge enabling them to become more engaged in social, economic and political webs of life. These authentic relationships in an open and mutually benefiting environment were clearly necessary to enable individuals to be ready for change (Bennetts, 2003). Of benefit was the social and contextual nature of learning, which was a strong theme that emerged from the interviews, supported by the cohesive nature and emotional and intellectual support from colleagues on the Foundation degree. The relationships formed and the mutual feeling of trust enabled the participants to engage openly in their learning development. By the end of the degree the participants were clearly critically reflecting on their own assumptions and beliefs allowing their personal and professional voices to be heard. This was demonstrated by Emma and Rachael as they both described moving from having nothing to offer to a belief that they had a voice in their professional capacity. It is not clear however if the reflective process inspired the transformation or was because of it, but it certainly appeared to maintain it. The power of critical reflection so engaged Nicky that she explored the effects with her fellow colleagues in her independent studies for her Foundation degree and B.A. studies. She has now just embarked on a Master's programme with a focus on the role of critical reflection for undergraduates.

Becoming aware of the assumptions that underpinned their ideas and beliefs was a threatening emotional experience for some participants when the need to change was recognised and perspectives were challenged and transformed (Mezirow, 2000). Transformation of their meaning perspective had a significant impact on some of the participants as it changed the way they made new meanings about the world and, most significantly, how they saw themselves. If, as Mezirow contends, our values and sense of self anchored in our frames of reference are located in our identity and agency then it is understandable that challenging our frames of reference can give rise to an emotional dispute about who we are. This was revealed in Emma's narrative through her developing understanding of her self-identity through a candid portrayal of the impact of her changes. For Rachael this was more profound as she divulged that her *protective bubble...of dyslexia had been removed* and that it was a *grieving process*. Whilst dyslexia is clearly not an assumption or belief there were clearly underpinning assumptions and beliefs for Rachael that had helped her come

to terms with who she was prior to this episode. This indeed was a whole life change for Rachael that brought with it altered frames of reference through which she viewed her world. The revision of our frame of reference may lead to a paradigmatic shift in meaning perspective for an individual; that is a perspective transformation (Mezirow, 1995; Taylor, 2007). This shift is seen as a non-reversible change and was a change voiced by Rachael and Emma during our discussions.

The transformation in frame of reference is irreversible but the maintenance or continuation of the transformation is not a matter that seems to be discussed extensively in the literature. For Emma and Rachael a threshold has been crossed and they now are residing in a new place with a perspective viewed through a new frame of reference. This new worldview has opened the threshold to many other views, but I question whether transformation then becomes static or is it self-perpetuating as these frames of reference, now explicitly recognised, continue to shift affording different vistas.

The conditions of change readiness and openness to learn, exhibited by all interview participants, related to the recognition of assumptions and change of form and meaning have been referred to as necessary for change process to occur. However, it is clear that these conditions were not initially adequate for transformation to take place. This is observed by Taylor (2007) who suggests, in the spirit of emancipation and action, it is not enough to recognise the need or the capacity for change but transformative learning involves the **will and power** to change. This will and power came with its own transformation for the participants as they developed self-belief and so moved towards a more inclusive and discriminating relationship with others, their learning institution and the wider society, including their professional status thus developing Keegan's self-transforming mind. I suggest the will and power referred to here can also be related to the context and situation of learning. As has been considered the social and contextual backgrounds, both past and present, are significant in forming our active frames of reference. Biesta (2010) observes positive learning experiences can transform people's lives but negative experiences can undermine their self-belief convincing them learning is not for them as was the case with four of the participants. Although these participants had negative experiences in education their life experiences to that point had helped them develop an open and change readiness disposition thus creating the environment conducive for transformation to take place. This is evident as Emma and Rachael crossed an epistemological threshold to a place where knowledge is provisional with recognition

of different ways of thinking about knowledge as it took on personal but rational and integrated meaning. Emma suggests these changes might have to do with the different learning environment as a *difference in how we've been learning, and the difference this learning journey was compared to before. So there is a lot around that's felt different.* Furthermore she described it as an *opportunity to re-evaluate, everything that happens to you... there is that moment where you can go: do my values still apply, do these truths, does this knowledge that I've held, is that still appropriate?*

Personal prior life experiences and sociocultural contextual factors can be seen as significant in transformative learning. I suggest this study has shown certain transformations are the product of a particular context signifying that Mezirow's notion of transformative learning pays too much attention to the individual and not the individual within their sociocultural context. Taylor (2007) proposes the role of context and transformative learning is an area of research as yet overlooked. I also consider there are questions to be asked alongside this relationship concerning the implications for epistemological change.

6.5 Summary

The outcomes of this study demonstrate the shift towards an evaluativist stance with more sophisticated beliefs occurring when the student became the primary agent of their own learning. This shift was related to: an awareness that knowledge is provisional, with a greater tolerance of other interpretations; knowledge taking personal meaning; a change in use of knowledge; and, a change in ways of thinking about knowledge through a transformational process where reflection and dialogue was based on an understanding of self. The change in personal epistemological belief structure was not the addition or substitution of capacities but the transformation of an unrecognised socialised epistemology to a more tacit self-authored epistemology (Kegan, 2000).

This study found the model of transformative learning to be effective at capturing the meaning making process of adult learners and the relationship to other ways of knowing as the epistemological belief systems shifted. From a critical realist perspective I propose that epistemological beliefs are structures that can be in place at the real, actual and empirical level. What moves these to the empirical level where they can be known is the change in meaning perspective through transformational

learning. Therefore, I suggest a model that incorporates the understanding of the relationships between the individual and the context of epistemological change where the impetus and mechanism for this change is transformational learning. The very nature of a model is limited as it can only symbolise the process it purports to capture, nevertheless as a useful visual aid the diagram in Figure 6.2 shows a representation of the process of transformation experienced by the students in this study.

This process began with a shift in dispositions and attitudes built up over time due to the immersion in a new learning environment that was the Foundation degree. These dispositions and attitudes are seen as the underlying structures residing in the real domain so facilitating the agency of change as they shift in response and reaction to the changes in the students' contextual and social circumstances. Therefore these dispositions and attitudes, depicted in the first box at the bottom of the diagram, are changed and are the means for change. The influence of the resultant change is represented by the direction of arrows.

Whilst the notion of the disorientating dilemma is situated after the readiness and openness for change it is not constrained by a box as it is possible for these dilemmas to vary in nature and time. They were either gradual or epochal, and occurred at different times triggered by a critical incident or major life transition. It is significant that these disorientating dilemmas were the catalyst for change which was then explored through critical reflection.

Mediated by the context and situation of learning the dispositions and attitudes then continue to manifest themselves through the will and power to change. This gave rise to a change in a frame of reference in the actual domain culminating in a transformation. The frame of reference is recognised here as an individual's way of knowing and thus describes their epistemological beliefs (Kegan, 2006). In coming to know their frame of reference the students began to recognise and take ownership of the assumptions, values and beliefs through which they viewed both themselves and the world. Their structures of meaning were then reformulated through critical reflection and dialogue.

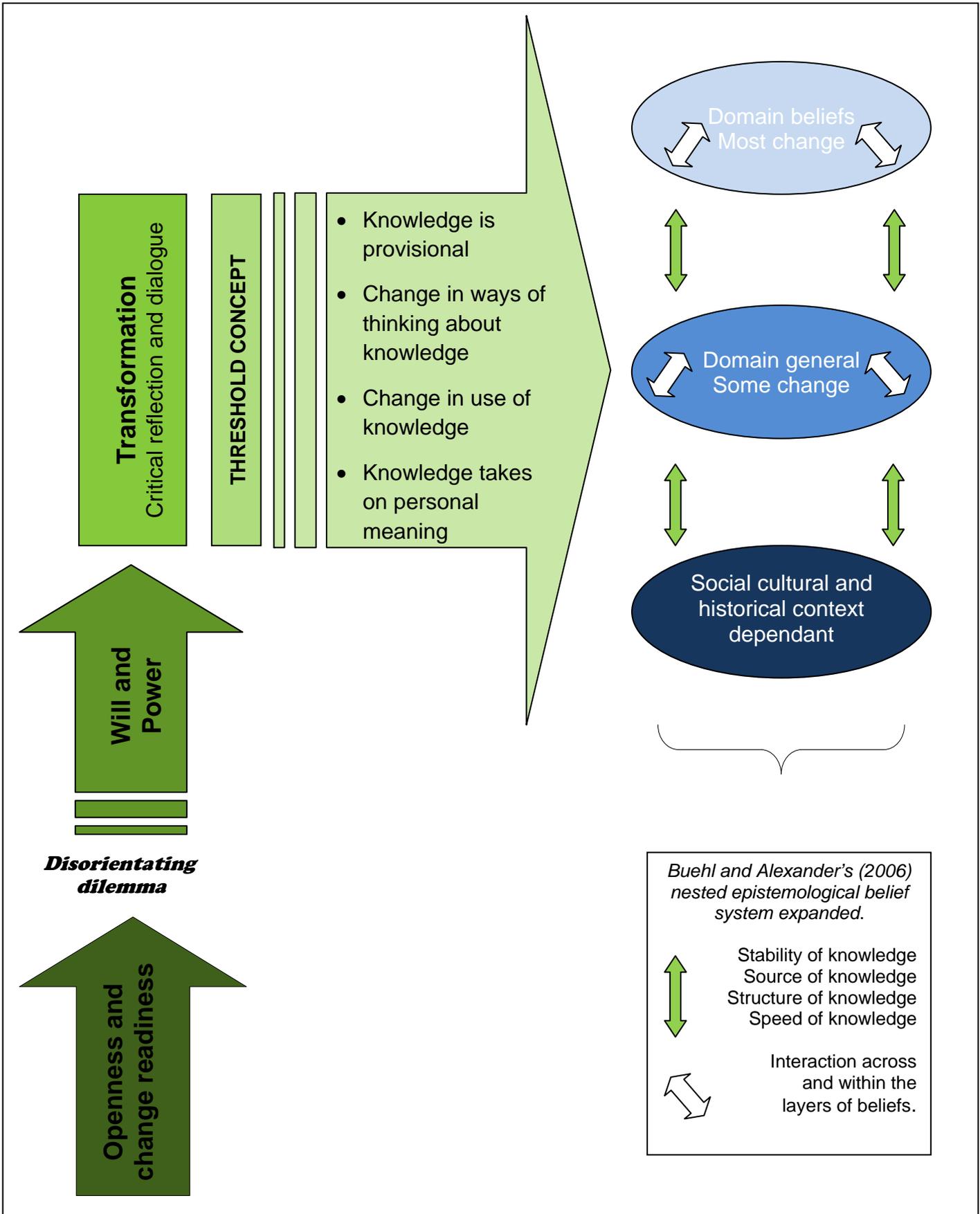


Figure 6.2 Model of epistemological change

Continuing with the attitudes of openness and change readiness, this brought the students to a threshold where conceptual change took place allowing a perspective transformation as new understanding was assimilated into who they are (Mezirow, 1978). This epistemological transformation reflects Baxter Magolda's (2004:31) notion of 'a shift to a more complex set of epistemological assumptions rather than the acquisition of particular learning strategies or skills' so endorsing the view that epistemological changes are central to transformation where 'we change the very form by which we are making our meaning' (Kegan, 2000:53).

The transformation of an individual's landscape of understanding is seen as irreversible (Meyer and Land, 2006) and is depicted by the single headed arrow which illustrates the key areas of change experienced by the participants. The inclusion of these epistemological belief changes here is not to suggest that these changes occurred equally, uniformly or at the same time but indicates the changes that did occur. The recognition of these changes exposed the epistemological beliefs at the empirical level as the students demonstrated the shift from the socialised mind to a developing internal authority with recognition of their own self-authored belief system, to a transformed mind. This allowed them to negotiate and act on these meanings and values thus further interacting with the different aspects of the epistemological belief system. This system is represented here in blue ovals as an expanded version of Buehl and Alexander's (2006) nested belief system to highlight the different domains where change could take place. In this system the development of epistemological beliefs is an iterative process shown by the two-way green arrows as epistemological beliefs develop through interaction with each other and in response to real-world situations.

For the participants as students on the Foundation degree the shift in epistemological beliefs impacted on their learning at higher education level but also impacted on their professional lives in their work environment. There were inconsistencies in terms of beliefs about knowledge, knowing and learning in these different contexts. Throughout the two years the beliefs that were operated in both contexts became more sophisticated with a shift towards a more evaluativist stance, though to different extents for different individuals. The transformation in these participants demonstrated an increase in self belief and emphasised the 'what can' be achieved rather than 'what can't' of learning which is a less restrictive view of learning leading again to more openness and change readiness.

To conclude, it is suggested here that transformative learning is the mechanism of epistemological belief change through critical reflection and dialogue. This transformation is activated if an environment is in place to facilitate perspective transformation of a new frame of reference so enabling an implicit and explicit engagement with personal beliefs. This will only occur if change-readiness and openness to learning is in place which is then activated by will and power to change. It is clear that the social and cultural context as an impetus of change is significant however as Sinatra (2003) suggests further understanding will come from looking at the mechanisms by which external and internal events interact in these different contexts. Therefore an examination of this change needs to be made as it is occurring. This study goes some way to engage with how the change in this context contributed to the transformation therefore limiting the criticism raised of transformative learning's decontextualized view of adult learning.

This case study focuses on a particular cohort of Foundation degree students who are recognised as a marginalised group in relation to the wider undergraduate population. Whilst the outcomes presented here are particular to these students this study was about making connections and having insights with the aim of looking at relationships and processes. There are many different experiences that influence all undergraduates' engagement with learning, therefore, whilst I am not suggesting that the outcomes here are wholly generalisable to the wider population, I do propose that the key outcomes representing in the model may illuminate more general issues related to the learning contexts of other undergraduate populations. This now presents an opportunity to promote further consideration, discussion and research about development of degree students relating to their epistemological beliefs and the potential for transformative learning.

In line with Biesta (2010), I do not suggest this model represents a mechanistic causality but rather a complex interaction with the notions of change readiness, knowledge perspective and so on that are entirely dependent on the domain, context and environment of learning. Fundamental to this model is the complex socio-cultural world in which we reside. The open and mutually benefitting environment of the Foundation degree was a primary factor in enabling the students to be ready for change. Although I offer this model as a view I remain cognisant that this *maybe* the case rather than suggesting that this *is* the case (Sayer, 2000).

Chapter 7: Conclusion

*We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.*
T.S. Eliot Four Quartets: Little Giddens

This study has shown that engagement with the Foundation degree exposed the participants to a new educational environment that brought about disorientating dilemmas and cognitive conflict resulting in a transformed frame of reference and reconstruction of epistemological beliefs, so developing perspectives from an evaluativist position. It is suggested that exposure to different academic knowledge, and the space to apply this, increased the self-beliefs of the participants enabling a more open and reflective approach to learning which gave them the will and power to transform, so promoting epistemological belief change.

Various studies with students in higher education in different contexts and subjects have shown that developed epistemological beliefs are important to learning in higher education. This study is the first that links these findings to students on a Foundation degree. It adds to the research that demonstrates the significance of the fundamental relationship between epistemological beliefs and learning by concluding that development of epistemological beliefs brings about more complex and metacognitive skills for learning. However, Brownlee et al. (2009) suggest we have a pedagogical dilemma of how students' epistemological beliefs may be changed to bring about the best learning experience. This exploratory study goes part way to answering this problem by drawing on the revealed relationships between epistemological belief and conceptual change linked to transformational learning by proposing pertinent next steps for both practice and research. In addition, by integrating different fields of research relating to the educational context it provides cross-referencing for future research in transformative learning, conceptual change and epistemological belief studies. As such this study is not a definitive account of epistemological beliefs and transformative learning but I believe it adds original understanding to the body of evidence of these constructs.

The conclusions of this study are now presented which reflect the implications for my own personal and professional learning. Firstly, the limitations of this study are

recognised, followed by the importance of epistemological beliefs on students' learning, and then the implications for teachers' practice and subsequent teaching and learning on a Foundation degree. Finally there is a reflection on my own professional and personal learning.

7.1 Limitations

Every effort has been made to recognise and address the specific limitations of this study as they have arisen; these are examined fully in the preceding discussions. Here I highlight some general limitations that may have impacted on the study.

Whilst limited by context and time the claims made in this study have been socially and contextually situated recognising the complexities therein. Whilst it was not my intention for this research to lead to generalisable knowledge the research does have applicability and value in a real-life setting of people making life changes through the engagement in a Foundation Degree; this has been achieved through a flexible approach without a lessening of rigour. The study has illuminated more general issues presented as theoretical propositions giving insights into other similar groups within a Foundation degree, exposing the complex social phenomena within their immediate individual context.

There may be a philosophical disagreement with the theoretical perspective used, which could be considered a limitation, however there has been an honest and open exploration of my position throughout. Choices have been moderated by my own beliefs and experiences but these have been well documented. It has been acknowledged that the interpretations of the data collected in this study are the result of my constructions alone. As such I am very aware that there may be different interpretations of the same data and perhaps different conclusions. Moreover as a new educational researcher I do not have the experience of a more seasoned researcher. As the researcher is a key research instrument this could be considered to be a limitation. However, I believe that the clarity and openness with which I have presented this study will mediate this allowing me to develop my practice as a researching practitioner.

7.2 Implications for practice

As has been explored and demonstrated in the outcomes of this study epistemological beliefs influence how individuals are likely to perceive knowledge, knowing and learning so playing a critical role in the learning process. These beliefs affect learners and teachers alike in their approaches to learning and engagement with pedagogy. I address the implications for practice through student beliefs, the influence of teacher beliefs on student beliefs, and learning environments.

Students' epistemological beliefs

Understanding the role of the student and their own epistemological development has been shown to be important in the learning context. The evidence from this study is compelling and reflects the literature which suggests individuals' epistemological beliefs affect knowledge construction and reconstruction, and their engagement with the learning process. The benefits of ascertaining our students' beliefs are therefore logical and compelling.

The implications for practice for practitioners is significant as an appreciation of these beliefs will enable us to understand the needs of our students better and develop authentic learning experiences to foster their achievement and engagement within their Foundation degree. However, adult educators do not routinely address or draw on their students' epistemological assumptions. This can mean that their students' meaning-making efforts are not understood. For example, if these beliefs are not recognised then absolutist 'knowers' may find it hard to engage with learning discussions in the classroom based on drawing out opinion and exploring reasons for differences. A key area in this study was the students' representation of authority. This category showed the least change towards sophisticated beliefs during the Foundation degree suggesting, to some extent, a continued belief in the authority of the teacher. The implication of this naive belief is significant to the learning situation and teachers need to be aware of the responsibilities this notion bestows upon them.

In addition, for marginalised groups with negative experiences in education, such as Foundation degree students, it may be counter-productive to challenge all naïve beliefs, both epistemological and conceptual, until the understanding of beliefs and control of learning becomes intentional in the role of the student. It is important for

the individual and the teacher to know these beliefs to enable them to achieve their full capacity in higher education.

Whatever theory of knowledge, knowing or learning a student espouses, it is the theory they enact that is significant in their engagement with learning, therefore there is a need for the students themselves to engage with their own beliefs and assumptions. This should enable an appreciation of how their worldviews may impact on their learning thus raising metacognitive awareness of their own beliefs and assumptions about knowledge and knowing giving them access to their own development and subsequent learning.

Whilst this is a very complex system it is the explicit engagement with an understanding of epistemological beliefs that facilitates the intentionality and reflexivity of learners. As Alexandra and Sinatra (2007) explain, a learner who can make a controlled intentional analysis of a new conception will afford themselves the opportunity to make productive choices in the learning process that will result in knowledge restructuring and long-lasting conceptual change. The transformations that happened to the students in this study created a shift in how they understood themselves as learners and the implications for the task of learning. By allowing the students to take an active stance and making the 'what' and 'why' of learning explicit, there is the potential to influence lifelong learning beyond any situated learning activity in higher education (King, 2004).

As practitioners we therefore need to be mindful that if students are being restricted by their assumptions it will impact on their learning. Knowing learners' current epistemological beliefs and day to day challenges may enable transformative learning (Kegan, 2000) by triggering the mechanisms of belief change as depicted in the model presented in this study (Figure 6.2). Although there are obvious benefits of this for teaching and learning there is not yet a simplistic, clear and understandable way of ascertaining the epistemological beliefs of our students which means that many practitioners are unable to make use of this information. It is paramount for future research to develop a more accessible way to explain the importance of epistemological beliefs in learning and to enable practitioners to access the beliefs of our learners.

Teachers' epistemological beliefs

There is a responsibility for both the teacher and the student in the learning situation but Bendixen and Feucht (2010:566) suggest the teacher is 'an epistemic gatekeeper of sorts for students'. This draws attention to the key role of the individual teacher and implications for their practice in recognising how epistemological beliefs, intentions and choices might influence the learning climate in the classroom. Therefore, not only is it important to have an appreciation of our students' beliefs, it is essential that we are cognisant of our own beliefs.

As teachers bring their own views of knowledge to the teaching and learning context their personal epistemological beliefs will affect their role as a practitioner and influence their choices of teaching and learning strategies. There is a need for teachers to have an explicit understanding of their own beliefs and assumptions so there may be an active engagement with the development of student beliefs.

To develop this understanding of self there is a need for teachers to be reflective practitioners (King, 2004; Entwistle, 2007). This reflection would enable an understanding of their own philosophy of education underpinned by an acknowledgement of their beliefs and assumptions to enable them to plan for the different components of the learning process. Notably this may well take teachers through the same experience of transformation. Murphy (2007) encourages us to see truth through the eyes of our students and so initiate conversation and experiences that might encourage students to expose and begin to justify their understanding.

The beliefs held by teachers may well be constrained by aspects such as accountability and structure of the system operating at levels out of their control. Therefore, it is important to appreciate these influences of the wider environment and contexts of learning.

Environment and context

The outcomes of this study indicate that the development of Foundation degree students' epistemological beliefs depends significantly on the learning environment. It is apparent that this development does not happen in a vacuum nor do epistemological beliefs stand alone but are part of a complex, variable and intertwined system. Therefore the environment and context are central to this development and

are clearly influential in the shaping of students' epistemological beliefs; moreover there is reciprocity between the individual and the environment they engage with. What is not clear is the degree of influence the context has or how much can be attributed to learner beliefs. Nevertheless, Chai et al. (2006) and Schraw and Sinatra (2004) advocate a conscious attention to students' epistemological beliefs and a re-conceptualisation of how courses are designed at higher education.

The findings of this study suggest that it is important to allow learners to take an active stance and more responsibility for their actions and learning. An environment which facilitates explicit critical reflection and dialogue as a specific and continuous part of the course relating to the nature and complexity of their beliefs (Brownlee et al., 2009) would enable this active stance and the problematisation of knowledge and knowing. However, according to King (2004) it is a too simplistic and mechanistic solution to assume that specific learning activities lead to transformation; rather it is learning experiences which allow students to approach new ideas, to be reflective and engage in dialogue. The experiences of critical reflection and dialogue on the Foundation degree were seen as a strength as the students engage in enquiry activities where they have to design, analyse and justify these enquiries relating theory to practice. The success and benefits of this approach needs to be built on with explicit engagement with these activities relating to their epistemological views so fostering a further engagement with the dispositions and attitudes to learning emphasising and modelling the changing nature and complexity of knowledge.

There could be an assumption that our adult learners on the Foundation degree are self-directed and independent learners but this, as has been shown, is not always the case. As Mezirow (2000) warns, there is a danger in the accepted model of adult education which involves the transfer of authority from the educators to the learners too quickly. This assumption challenges the socialised mind when they are not necessarily ready for self-authorship immediately. There does need to be a shift in authority from teacher to learner, but this shift needs to be negotiated depending on the epistemological position of the learner. This negotiation can come at the level of course design as well as the personal level of teacher and student.

Meyer and Land (2006) suggest that when designing courses tutors need to be aware of the process of personal transformation that might be experienced by students. They suggest that the linear learning outcomes model may be problematic to students who are encountering 'troublesome' knowledge and there should be more tolerance

to allow a recursive approach and an accommodation of students' diverse learning needs. There needs to be more modelling of 'evaluativist' beliefs to enable the students to develop more sophisticated views of knowledge and knowing and relate this to their own learning. Moreover, Brownlee et al. (2009) also suggest that integrating the evaluativist approaches to assessment procedures in higher education, which allow students to develop personal meaning, would also develop epistemological beliefs. As has been reflected in the participants' stories, Biesta (2010) observes that positive learning experiences can transform people's lives but negative experiences can undermine their self belief convincing them learning is not for them. Biesta explains that it is our sense of identity that can influence our willingness to participate in lifelong learning. There are clear implications for the learner and for curriculum design advocating a more flexible design to accommodate a variety of students' epistemological beliefs and learning needs. This would need a creative approach to the assessment procedures on Foundation degrees which are bound by the need for academic rigour and quality. However, this challenge is one that faces many degree programmes in higher education

As Kegan (2000) notes and has been shown in this study, transformative learning goes beyond new skills towards an increase in self-confidence to a new understanding of self that can be very emotional. As educators we need to be aware of our ethical responsibilities and the consequences of our actions. If we can better understand the interaction between these contextual and pedagogical variables with different learner characteristics and beliefs then there may be a better design of degrees to facilitate the move from a 'socialised mind' to a 'self-authored mind' in a tacit engagement with the more sophisticated beliefs. However, as King (2004) suggests, there is a responsibility on the learning institutions to provide a supportive environment, although ultimately learning and its consequences rests in the learner's hands.

In summary, there needs to be conscious attention to students' epistemological beliefs and a re-conceptualisation of how courses are designed in higher education (Chai et al., 2006 and Schraw and Sinatra, 2004). Institutional support is needed to act and give guidance on how this new understanding may manifest itself in practice. Therefore, in line with Taylor (2007), this study suggests that greater attention needs to be given in practice to: the role of context, the varying nature of the catalysts of transformative learning, the increased role of other ways of knowing, and the importance of relationships. The Foundation degree in this study will be going

through a revalidation for the academic year beginning 2014, thus affording a good opportunity to incorporate some of these elements into the redesign of the course. There have already been some stimulating preliminary discussions with the programme managers about the notion of reflection and its potential impact on our learners. In addition, there has been a tutor training session where the barriers to learning were discussed in relation to tutor perceptions. This was done with a view to exploring the beliefs and assumptions held by our students in future meetings to inform the new degree.

7.3 Suggestions for further research

Throughout the discussion I have highlighted possible areas for future enquiries. Here I suggest areas related directly to the continuation of this study, but it clearly is not an exhaustive list.

- To continue to explore the complexities of epistemological development. We need to be clearer about what is meant about epistemological development and develop finer-grained measures of these changes (Elby and Hammer, 2010).
- To develop a measure for epistemological beliefs for the use with small groups. The majority of the studies to date examining epistemological beliefs rely almost exclusively on self-report data. These instruments are continually revised to find a measure that is reliable and valid. As the links between beliefs about knowledge, knowing and learning are becoming more established and the importance of understanding the epistemological beliefs of our learners is emphasised, it is becoming more pressing that a measure is devised that can be used with confidence by teachers with their students. As many of epistemological beliefs are tacit perhaps the first step is to enable these to be articulated which suggests the use of narratives and vignettes rather than surveys.
- To explore what fosters transformative learning in a higher educational environment. A focus here would be on the context and perpetuation of transformative learning.
- To develop a better understanding of the process by which beliefs undergo transformation.
- To explore the influence of personal epistemologies on pedagogy

My immediate personal areas for continued research are:

Students:

- To find a more effective method of revealing students epistemological beliefs. To trial scenarios or vignettes with the new cohort of students. I have begun this by adapting Schraw and Olafson's (2003) vignettes about relativist and realist views about teaching changed to a focus on learning.
- To explore ways in which students might explicitly engage with these beliefs.
- To continue to foster a sense of community within the students. This is clearly a strength in this course.

Tutors:

- To enable tutors to engage with, and reflect on, the implications of epistemological beliefs, conceptual change and transformational learning in the teaching and learning of Foundation degree students.
- To facilitate tutors' active and reflective engagement with the realisation of their own beliefs and philosophy and how these might influence their pedagogy.

Course:

- To build transformative learning opportunities into the Foundation degree, building on the current effective practice of critical reflection and dialogue.

7.4 Personal Reflections

I embarked on these doctoral studies because of my own transformational experience recognising the power of challenging and engaging with my own beliefs and assumptions. As much as there have been changes in the participants understanding of self this has also been reflected in my own identify as a scholar and practitioner as I have gone through another transformation. My naïvety as I embarked on this odyssey was perhaps complemented by the passion with which I engaged in the process. The doldrums and high seas experienced brought exhaustion and exhilaration, and has also brought forth exciting new horizons of further research.

My personal learning is closely entwined with my professional learning since this whole process has been one of personal growth and development of skills,

knowledge and understanding. I experienced intellectual highs and lows exemplified by my tussle with the literature in exploring my theoretical approach in Chapter 2. My assumptions are no longer taken for granted beliefs, that is not to say they make perfect sense either (Brookfield, 1995). However, my odyssey has led me to a place where I can interrogate and challenge my own meaning structures and assumptions about teaching and learning and be critically reflective about myself. Whilst the odyssey is the metaphor I use to describe my transformation on this continued quest, the enduring metaphor of the crystals captured in Indra's web symbolises my epistemological beliefs. Here I see knowledge and knowing as a product of the shifting shape of interactions and connections between the self and the lived context where knowledge and knowing is real for the world it represents but my understanding is that this world can change.

Taking heed of Duell and Schommer-Aitkins (2001) advice that researchers should look beyond their own personal framework is difficult. However, due to the renegotiation of my research questions this did allow me to look beyond and so come to understand the transformational nature of change that occurred during the degree alongside the change in epistemological beliefs.

I have approached this research as a professional and a researcher rather than a research professional, as that is indeed what I am and continue to be. This I consider to be a very privileged position and I continue to engage with students re-entering education through their Foundation degree through to practicing teachers and their engagement with their own research as practitioner researchers.

My engagement with this level of research has brought many challenges, but also enlightenment. As I engaged with the participants' interview transcripts and personal narratives I was moved by the privilege of my position. In trying to understand the other through a cycle of hermeneutic understanding I did learn about myself which allowed a new understanding of self to emerge during this research. The study has evolved and adapted over time as a continual process of reflection. It is fair to say if I knew where I was going I would not have started where I did, but although I do not think I have finished exploring, I feel that I am becoming to know this place for the first time – it was my time too.

Appendices

School of Education and Lifelong Learning

Certificate of ethical research approval

STUDENT RESEARCH/FIELDWORK/CASEWORK AND DISSERTATION/THESIS

You will need to complete this certificate when you undertake a piece of higher-level research (e.g. Masters, PhD, EdD level).

To activate this certificate you need to first sign it yourself, then have it signed by your supervisor and by the Chair of the School's Ethics Committee.

For further information on ethical educational research access the guidelines on the BERA web site: <http://www.bera.ac.uk/publications/guides.php> and view the School's statement in your handbooks.

READ THIS FORM CAREFULLY AND THEN COMPLETE IT ON YOUR COMPUTER (the form will expand to contain the text you enter).
DO NOT COMPLETE BY HAND

Your name: Laura Osborne

Your student no: 560028963

Degree/Programme of Study: Ed.D Generic Programme

Project Supervisor(s): Prof. Bob Burden and Dr Shirley Larkin

Your email address: ljmosborne@hotmail.com

Tel: 01579 384927

Title of your project:

An exploration of the epistemological beliefs of Foundation Degree students and the relationship of these beliefs with their emerging self beliefs as learners.

Brief description of your research project:

There is an understanding that our belief about knowledge and knowing has an impact on us as learners. The aim of this research is to explore Foundation Degree students' perceptions of themselves as learners with respect to their beliefs about knowledge and intelligence. I seek to understand and make sense of their experiences and meanings in relation to their learning so I may become familiar with some of the complex phenomena in the students' perceptions of themselves as learners. This will be approached in the first instance through the use of questionnaires. There will then be follow-up focussed

interviews with a selected number of participants to gain an in-depth understanding of their beliefs and relationship with their learning through their life stories.

There is an exploratory purpose to this research as I seek to understand and describe some of the complex phenomena in these students' perceptions of themselves as learners in an illuminative framework. Whilst it is not my intention for this research to lead to generalisable knowledge and recommendations I would like to ensure the research has applicability to the real world of people making life changes through the engagement in a Foundation Degree.

Give details of the participants in this research (giving ages of any children and/or young people involved):

There are 41 adult participants, aged between 18 and 49, enrolled on a Foundation Degree. The study has been discussed with, and approved by, the director and programme leader of the Foundation Degree. The validating University of the degree has also been informed and approval been given.

Give details regarding the ethical issues of informed consent, anonymity and confidentiality (with special reference to any children or those with special needs) a blank consent form can be downloaded from the SELL student access on-line documents:

It is essential that the process of undertaking such research adheres to both sound ethical and moral principles. This research will therefore observe, and be in accordance, with the recommendations from BERA Ethical Guidelines for Educational Research (2004). I recognise the onus is on me, as the researcher, to apply these in an appropriate manner.

The aims and intentions of the study will be discussed with the participants to ensure a full understanding of the process of their engagement. I will make it clear that they can withdraw at any point with no detrimental effect to their studies. This point is vital in this study as I act as their tutor on certain modules. Each participant will be issued with a letter of consent outlining the aims and process of the study which they will be asked to sign if they are in agreement. Participants will be given a photocopy of the signed consent form for their records.

All reasonable efforts will be made to ensure confidentiality of data and to protect the anonymity of the setting and participants. Pseudonyms will be used in all research outputs to protect all participants. However it must be noted that the selection of participants for interview will be via code-named questionnaires so participants can be identified. They will be thereafter identified with pseudonyms to ensure anonymity. Anonymity and non-identifiability of all participants and the setting will be preserved in all research data and results, research reports, theses and publications. Data will be confidential to me and will not be disclosed to any unauthorised third parties without further agreement by the participant.

Give details of the methods to be used for data collection and analysis and how you would ensure they do not cause any harm, detriment or unreasonable stress:

Questionnaires and semi-structured interviews are the chosen methods for data collection. Interview participants will be chosen following the completion of the questionnaires by the whole group. Voice recordings will be made in the interviews, via a small unobtrusive recorder, for later transcription. Transcripts of interviews and results of the questionnaires will be freely shared with the participants should they so wish.

Although it is not anticipated that either the questionnaires or interviews will raise sensitive issues I am nevertheless aware of the possibility. I am conscious that some participants are making life changes through the engagement in a Foundation Degree, therefore discussion about factors that influenced their decision to do the degree, and the barriers they have overcome, may engender some emotional responses. These responses, if they arise, will, of course, be treated sensitively and with understanding.

Give details of any other ethical issues which may arise from this project (e.g. secure storage of videos/recorded interviews/photos/completed questionnaires or special arrangements made for participants with special needs etc.):

It will be made clear to all participants how their data will be used in the research during the initial discussion. All information and data collected will be held securely and in confidence in respect of the University's guidelines. The information provided will be used for research purposes and will be processed in accordance with the University's registration and current data protection legislation under the Data Protection Act 1998. Data will not be used other than for the purposes described above and third parties will not be allowed access to them (except as may be required by the law). Any information given will be used solely for the purposes of this research project, which may include academic publications.

Storage of electronic records, such as the voice recordings, and paper records will be stored securely in a locked filing cabinet at my home. All transcripts will be encoded so preserving the confidentiality of participants. All resources pertaining to the research project will be kept for a minimum of three years.

The setting will be presented with copies of any publications or reports arising from the research. Such documents will also be made available to the participants should they so wish.

Finally even though the research will adhere to sound ethical principals I am aware that it will take time, as a novice researcher, to equip myself with a repertoire of skills needed for the ethical dilemmas that may arise during the research process. Thus it is necessary to be aware of my own views about the abilities, skills and experiences of the participants and how my own experiences contribute to the research process.

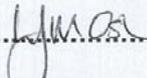
Give details of any exceptional factors, which may raise ethical issues (e.g. potential political or ideological conflicts which may pose danger or harm to participants):

There are no exceptional factors that are recognised at this point.

*This form should now be printed out, signed by you below and sent to your supervisor to sign. Your supervisor will forward this document to the School's **Research Support Office** for the Chair of the School's Ethics Committee to countersign. A unique approval reference will be added and this certificate will be returned to you to be included at the back of your dissertation/thesis.*

I hereby certify that I will abide by the details given above and that I undertake in my dissertation / thesis (delete whichever is inappropriate) **to respect the dignity and privacy of those participating in this research.**

I confirm that if my research should change radically, I will complete a further form.

Signed:..........date: 26.11.2009.....

N.B. You should not start the fieldwork part of the project until you have the signature of your supervisor

This project has been approved for the period: 01. 09. 2009 **until:** 30. 09. 2011

By (above mentioned supervisor's signature): .....date: 26. 11. 2009.....

N.B. To Supervisor: Please ensure that ethical issues are addressed annually in your report and if any changes in the research occurs a further form is completed.

SELL unique approval reference:..... D/09/10/21.....

Signed:..........date: 30. 11. 2009.....
Chair of the School's Ethics Committee

This form is available from <http://www.education.ex.ac.uk/students/index.php> then click on On-line documents.

Chair of the School's Ethics Committee
last updated: September 2007

Graduate School of Education

5th September 2009

Dear Student

You are being invited to take part in a research study. The research is being conducted through, and has been approved by, the University of Exeter. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

The purpose of this research

There is an understanding that our belief about knowledge and knowing has an impact on us as learners. The aim of this research is to explore Foundation Degree students' perceptions of themselves as learners with respect to their beliefs about knowledge and intelligence. This will be approached in the first instance through the use of questionnaires. There will then be some follow-up focussed interviews with a selected number of participants to gain an in-depth understanding of their beliefs and impact on their learning through their life stories.

Taking part

Participation in the research is completely voluntary. If you do decide to take part you will be asked to sign this consent form and you will be given a copy to keep. If you decide to take part you are still free to withdraw at any time without prejudice and without giving a reason.

Confidentiality

All information and data collected will be held securely and in confidence in respect of the University's guidelines¹. Data will not be used other than for the purposes described above and third parties will not be allowed access to them (except as may be required by the law). Any information which you give will be used solely for the purposes of this research project, which may include academic publications. All efforts will be made to ensure that you cannot be identified as a participant in the study. Anything that I write on the basis of the information you give me will be presented in anonymised form and I will make every effort to preserve your anonymity.

Conclusion of research and publications

If you are involved in the interview phase you will be supplied with a copy of *your* interview transcript so that you can comment on and edit it as you see fit. Findings from the research will be made available at the end through academic publications and other forms of dissemination.

If you have any further questions about the project please contact me at lo208@exeter.ac.uk
Thank you for taking the time to read this information.

Yours faithfully

Laura Osborne

CONSENT

This study has been explained to me to my satisfaction, and I agree to take part. I understand that I am free to withdraw at any time.

(Signature of participant)	(Printed name of participant)	(Date)
(Signature of researcher)		(Date)

One copy of this form will be kept by the participant; a second copy will be kept by the researcher

¹ Data Protection Act: The University of Exeter is a data collector and is registered with the Office of the Data Protection Commissioner as required to do under the Data Protection Act 1998. The information you provide will be used for research purposes and will be processed in accordance with the University's registration and current data protection legislation. Data will be confidential to the researcher(s) and will not be disclosed to any unauthorised third parties without further agreement by the participant. Reports based on the data will be in anonymised form.

BELIEFS ABOUT KNOWLEDGE, LEARNING AND INTELLIGENCE.

There are two questionnaires in this pack:

1. **Your beliefs about knowledge and knowing:** (From: Shraw, Bendixen and Dunkle, 2002)
2. **Your beliefs about intelligence** (From Dweck, 2000)
 - These questionnaires present a 5-point scale. Please indicate the extent to which you agree or disagree with the statements by ticking the relevant box.
 - Again, as far as possible, please respond according to the ideas you feel most often guide your learning, or are true for you as you start your Foundation degree

For both questionnaires:

- Please take your time to read the questions
- However do not spend too long thinking about the answer as often the first answer is the best!
- There are no right or wrong answers on either questionnaire.
- Please be as honest and truthful as you can.
- Please tick only one box. If you change your mind please make your new answer clear.
- It should take about 15 minutes to complete both questionnaires.

*Thank you for taking your time to complete this questionnaire,
Laura Osborne*

Your beliefs about knowledge and knowing

- 1 Most things worth knowing are easy to understand.
- 2 Truth means different things to different people
- 3 People who learn things quickly are the most successful.
- 4 People should always obey the rules.
- 5 Some people will never be smart no matter how hard they work
- 6 Absolute moral authority does not exist.
- 7 Parents can teach their children all there is to know about life.
- 8 Really smart people don't have to work as hard to do well in school.
- 9 If a person tries too hard to understand a problem, they will most likely end up being confused.
- 10 Too many ideas just confuse things.
- 11 The best ideas are often the most simple.
- 12 Teachers should focus on facts instead of ideas.
- 13 Some people are born with special gifts and talents.
- 14 How well you do in school depends on how smart you are.
- 15 If you don't learn something quickly, you won't ever learn it.
- 16 Some people have a knack for learning and others don't.
- 17 Things are simpler than most teachers would have you believe.
- 18 If two people are arguing about something, at least one of them must be wrong.

- 19 Children should be allowed to question their parents' authority.
- 20 If you haven't understood a paragraph of a book the first time through, going back over it won't help.
- 21 The more facts a subject has the easier it is to understand.
- 22 The more you know about a topic the more there is to know.
- 23 What is true today will be true tomorrow.
- 24 Smart people are born that way.
- 25 When someone in authority tells me what to do, I usually do it.
- 26 People shouldn't question authority.
- 27 Working on a problem with no quick solution is a waste of time.
- 28 Sometimes there are no right answers to life's big problems.

Strongly agree	Tend to agree	Neither agree or disagree	Tend to disagree	Strongly disagree

Your beliefs about intelligence

- 1 You have a certain amount of intelligence, and you can't really do much to change it
- 2 Your intelligence is something about you that you can't change very much
- 3 No matter who you are, you can significantly change your intelligence a lot.
- 4 You can learn new things, but you can't really change your basic intelligence.
- 5 No matter how much intelligence you have, you can always change it quite a bit.
- 6 You can always greatly change how intelligent you are.

Changes to questions on the EBI following pilot group suggestions.

The changes made are bullet pointed. The original questions are shown in italics with the actual question asked in normal font below.

- For consistency of terminology the use of 'students' was replaced by 'people' throughout.
- There was an extensive debate about the understanding of 'true' and 'truth' in Question 2, therefore it was decided to use Schommer's original question for this.

Question 2:

What is true is a matter of opinion.

Truth means different things to different people.

- The notion of 'theory' was replaced with 'idea' as the pilot group suggested the notion of engaging with theory at the start of the degree was intimidating (Question 10 and 12)
- The term professor was removed and teacher inserted to be more in line with what the students would be used to (questions 12 and 17).

Question 10:

Too many theories just confuse things.

Too many ideas just confuse things.

Question 12:

Professors should focus on facts instead of theories.

Teachers should focus on facts instead of ideas.

Question 17:

Things are simpler than most professors would have you believe.

Things are simpler than most teachers would have you believe.

- The pilot group suggested that at the beginning of a degree the thought of reading a whole academic chapter could be overwhelming, therefore chapter was substituted for paragraph.

Question 20:

If you haven't understood a chapter of a book the first time through, going back over it won't help.

If you haven't understood a paragraph of a book the first time through, going back over it won't help.

- The pilot group suggested science for some is never easy to understand which negated the purpose of the question.

Question 21

Science is easy to understand because it contains so many facts

The more facts a subject has the easier it is to understand.

Interview questions

Knowledge and truth

1. Please describe what you mean by knowledge.
 - a. Where do you think knowledge comes from? *Provenance*
 - b. To what degree do you think knowledge created or discovered? Is it a personal construct or does it sit outside?
2. Can knowledge change? Does it depend on the context? Can you explain your belief or give examples?

Truth

3. Is knowledge the same as truth? How? When? Explain.
 - a. Is truth unchanging?

Learning

4. Describe what learning means to you.
 - a. Describe yourself as a learner.
5. What do you think is the relationship between learning and knowledge?
 - a. Does one influence the other

Intelligence

6. What do you think intelligence is?
7. Do you believe we are born with a certain amount of intelligence?
 - a. What makes you think this?
8. Is intelligence is fixed or changeable?
9. What do you think influences intelligence – e.g. subject based, motivation? Opportunity?

Development of beliefs

10. What kinds of experiences have shaped your beliefs?
11. What have been significant influences? Do you think these beliefs will ever change – why?
 - a. *Can you tell me about the experiences when you doubted your beliefs? How did you resolve your doubts?*

Personal

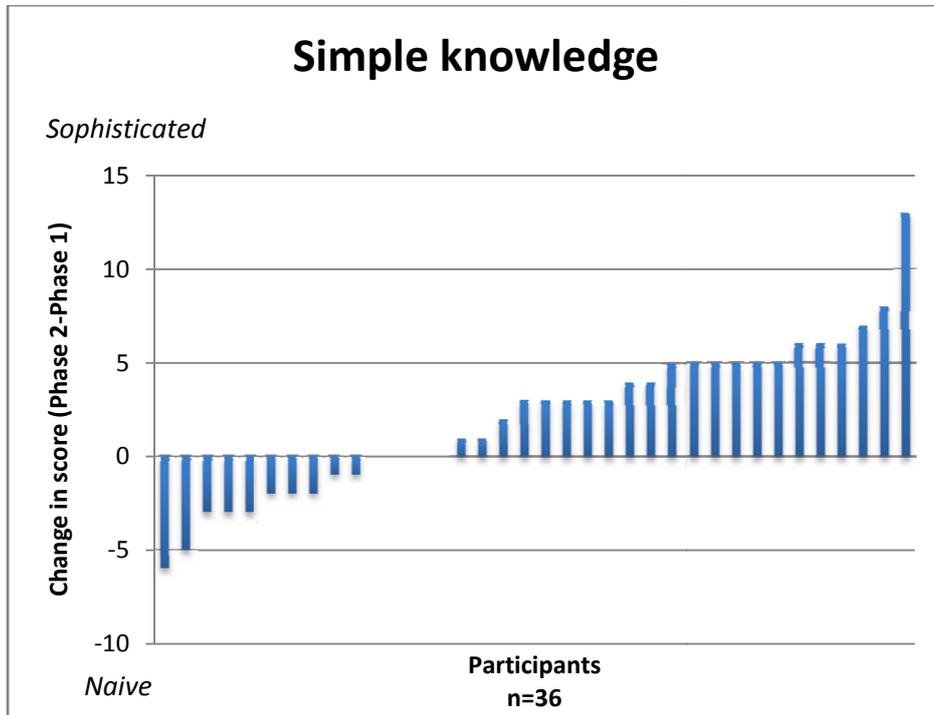
12. Phase 1 - What have been the main factors that influenced you in your decision to do a Foundation degree?
13. Phase 1 - What barriers have you had to overcome to be here? How have you achieved this?
14. Phase 2 - Has the course altered or impacted on your beliefs? How?
15. What are your hopes/aspirations for the future?

Phase 1 and 2 data for the EBI: Totals for each participant according to the belief subset.

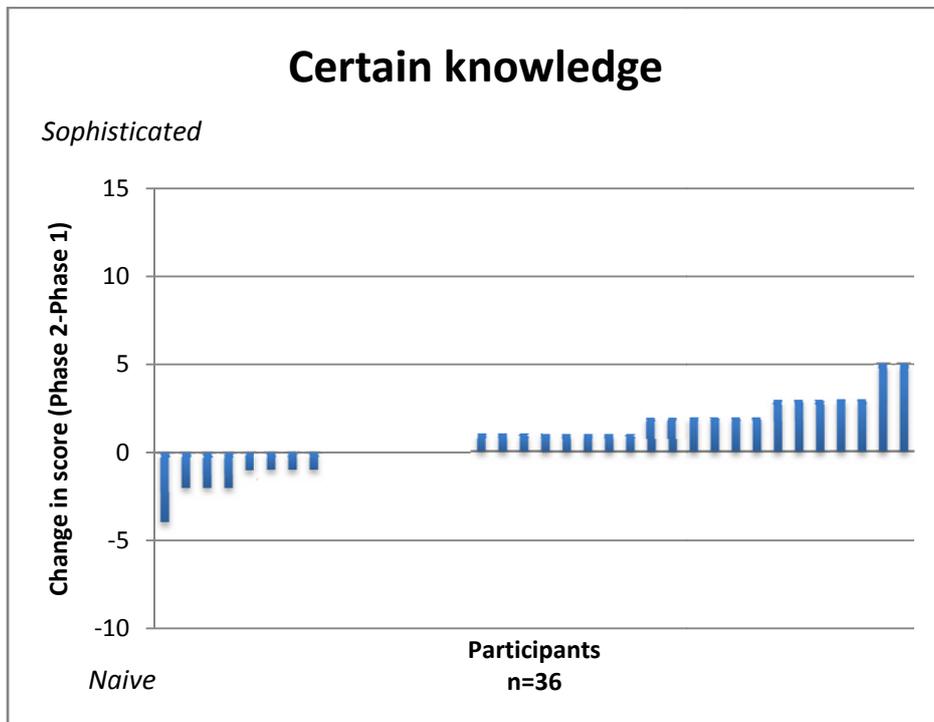
Negative change	No change	Positive change

	S	C	O	Q	A	S	C	O	Q	A
	21	16	21	14	12	20	16	21	12	15
	21	16	18	18	19	22	18	20	17	19
	18	17	21	14	15	18	15	20	13	21
	25	16	17	18	15	24	19	20	17	21
	25	13	22	19	19	25	18	20	19	21
	27	16	18	22	22	30	17	19	23	19
	20	14	16	17	17	23	16	18	19	18
	22	15	16	16	20	20	14	15	15	13
	28	18	18	24	23	25	18	14	20	19
	27	16	22	21	20	21	16	19	18	22
	22	17	21	20	22	24	20	21	20	21
	22	17	23	22	25	29	19	25	23	25
	24	15	18	18	20	27	15	22	21	16
	21	14	18	12	14	29	15	18	21	19
	18	17	16	17	19	23	19	15	23	23
	25	13	19	14	19	23	14	19	20	20
	19	17	17	21	18	22	17	20	18	19
	20	12	19	12	11	24	15	21	18	16
	28	19	24	22	23	26	18	21	22	21
	25	16	19	20	21	22	14	14	16	14
	16	12	19	11	13	29	15	22	22	23
	21	14	16	21	20	21	13	12	18	21
	16	13	15	11	12	20	14	15	14	13
	26	17	18	23	23	26	15	22	21	20
	28	17	17	20	19	23	13	17	18	18
	23	16	20	20	20	26	16	21	22	22
	23	16	23	18	19	24	18	24	21	21
	23	15	21	21	26	29	18	22	24	25
	24	15	23	20	24	29	16	23	23	23
	21	15	17	20	20	18	16	17	20	21
	25	17	25	21	20	30	19	26	23	21
	23	20	21	21	21	28	19	23	19	23
	19	15	17	17	17	24	20	19	22	17
	24	18	21	19	18	30	19	23	22	21
	18	17	15	17	20	23	17	21	19	22
	19	17	23	21	22	25	18	20	23	19
Total	807	568	694	662	688	882	599	709	706	712
Means	22.4	15.8	19.3	18.4	19.1	24.5	16.64	19.69	19.61	19.78
Results from EBI for each participant Phase 1						Results from EBI for each participant Phase 2				

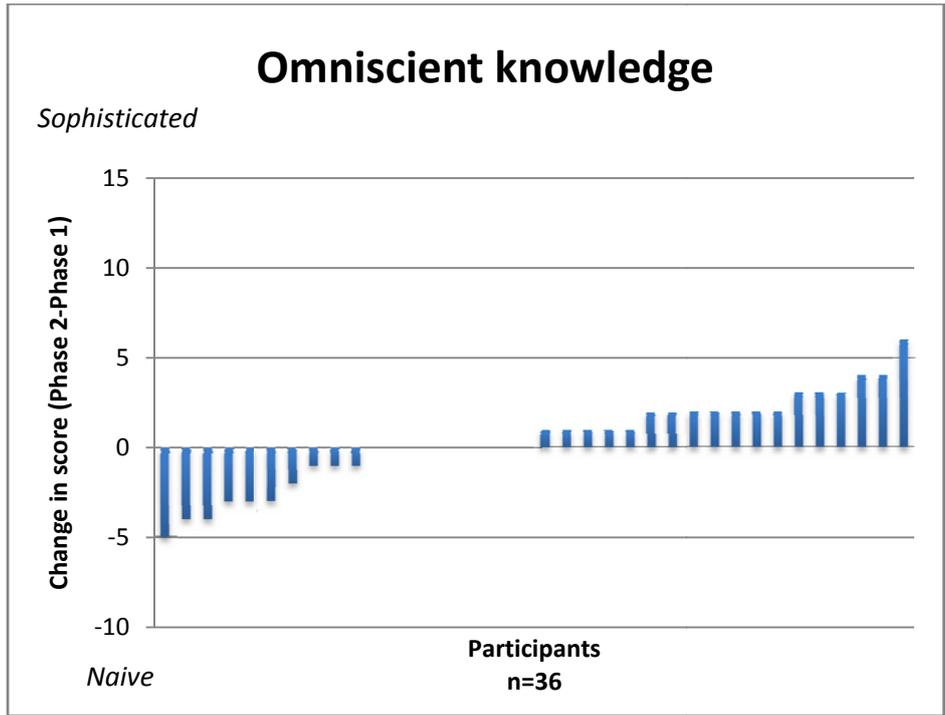
Graphs to show amount of overall change relating to naïve and sophisticated beliefs



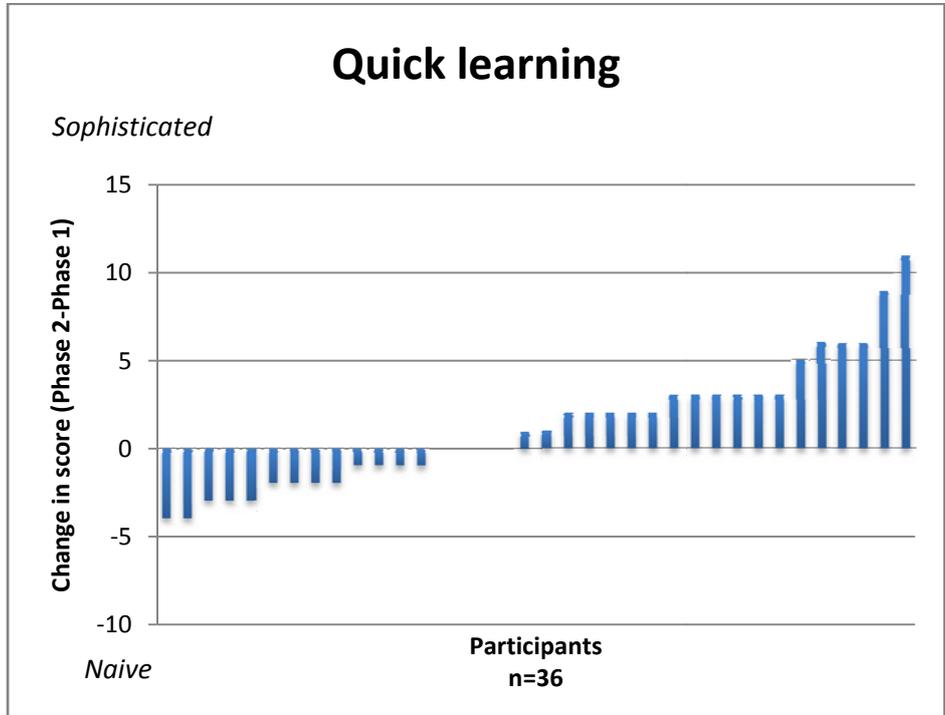
Appendix 7.1 Amount of overall change relating to naïve and sophisticated beliefs in simple knowledge.



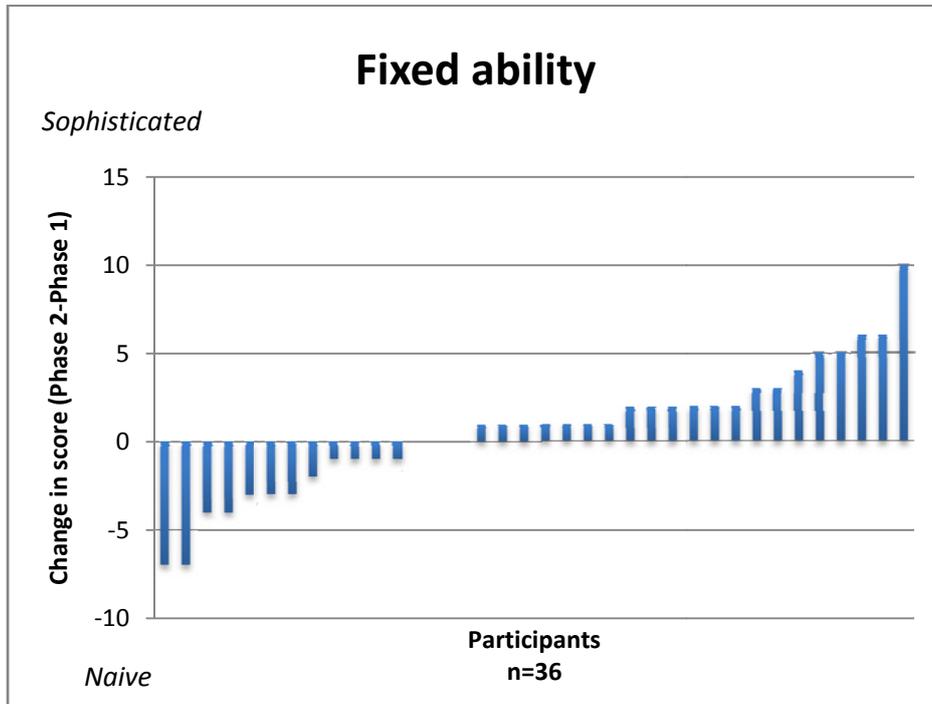
Appendix 7.2 Amount of overall change relating to naïve and sophisticated beliefs in certain knowledge.



Appendix 7.3 Amount of overall change relating to naïve and sophisticated beliefs in omniscient knowledge.



Appendix 7.4 Amount of overall change relating to naïve and sophisticated beliefs in quick learning.



Appendix 7.5 Amount of overall change relating naïve and sophisticated beliefs in fixed ability.

Statistical data for EBI and BAI questionnaires

<i>EBI</i>	S	C	O	Q	A
Total	75	31	44	15	24
Mean	2.083333	0.861111	1.222222	0.416667	0.666667
Std Dev	3.974747	1.944263	3.530367	2.465476	3.529468
SE	0.662458	0.324044	0.588395	0.410913	0.588245
T	3.144855	2.657391	2.077216	1.014003	1.133315
Paired t-test p-values, 35 degrees of freedom	0.0025	0.01	0.25	ns	ns
95% Confidence intervals for the mean increase in point score	0.738478 to 3.428189	0.20327 to 1.518953	0.027723 to 2.416722	-0.41753 to 1.25086	-0.52753 to 1.860862

<i>BAI</i>	Ability
Total	90
Mean	2.5
Std Dev	3.660601
SE	0.6101
T	4.097688
Paired t-test p-values, 35 degrees of freedom	0.0005
95% Confidence intervals for the mean increase in point score	1.261436 to 3.738564

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