Learning, innovation and 'tacit pedagogy' in workplace practice: a comparison of two high-performing organisations in different sectors

Jay Derrick

UCL Institute of Education

Department of Education, Practice and Society

Thesis submitted as part of an Ed D at UCL Institute of Education

July 2018

Declaration of Word Count

The exact number of words in this thesis is 44913. The abstract, statements, table of contents, acknowledgements, references and the appendices are excluded from the word count.

Declaration of Own Work

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

Signed

Abstract

This thesis reports on a study which uses a comparative analysis of two 'high-performing' organisations in different occupational sectors to identify aspects of workplace culture, work processes, and strategic orientations which are associated with innovation. The study investigates (1) the informal features of organisational culture, work processes and strategic orientation that support innovation; (2) how these features practically interrelate with the formal structures, policies and procedures of these organisations; and (3) how learning, innovation and practice are interrelated conceptually and practically. Interviews and focus groups with teams of practitioners within each organisation (n=24) were analysed to develop a conceptual understanding of the links between practice, learning and innovation which builds on and extends previous research on organisational development, capacity-building, work process design and culture. Its findings provide evidence supporting earlier studies suggesting that (1) 'expansive' rather than 'restrictive' organisations (Fuller and Unwin 2004) are more likely to be innovative; (2) cultures, work processes and arrangements providing productive conditions and opportunities for employee learning, and particularly for informal learning within and between teams, will also provide productive conditions for innovation; (3) the behaviours, activities and cultures within and across teams, including relationships and team-working practices that produce effective learning by team members, also support innovation; (4) aiming to embed 'innovativeness' widely across organisations, rather than treating innovation only as a matter for specialists, is likely to be effective in supporting innovation in contexts of rapid change; and finally (5) organisational orientation towards particular kinds of partnership working and mutuality, together with corporate commitment to expansive notions of 'public value' are associated with innovation. The study proposes refinements to the way the interplay between learning, innovation and practice is conceptualised, and introduces the concepts of 'tacit pedagogy' and 'entanglement.'

Impact statement

Research into informal modes of team-working within two high-performing public-sector organisations, one in education, the other in engineering, suggests a range of generic work practices and conditions likely to support learning and innovation.

This Ed D thesis study demonstrates the importance of informal aspects of work, both for employee learning and innovation, and for quality and productivity. It suggests that work process design should focus not just on explicit, formal and procedural frameworks, but also on social relationships within and beyond the workplace, informal norms of culture and behavior, and tacit and embodied knowledge and expertise held within teams. Furthermore, it suggests that highly-specified and high-stakes external accountability systems for organisations and practitioners tend to inhibit learning and innovation.

In particular, the research identifies several examples of observable team-working practices that, whatever the sector, are likely to support employee and innovation. These practices are found in both organisations in the study but are not supported to the same extent, depending on the management culture of the organization and the nature of the public accountability and oversight systems they work within.

These two new case studies on workplace learning and innovation in specific domain contexts are analysed in relation to well-established conceptual frameworks and debates. In particular the study is a contribution to the literatures on workplace learning, on the philosophy of knowledge and practice, on approaches to effective teaching, learning and assessment, and on the environmental conditions that support innovative workplace practice. It also offers generic findings about optimising resources and work processes for innovation that may be useful in other specialist domains.

Findings from this research were presented at the 5th International Conference on Employer Engagement and Training (2018), sponsored by the Edge Foundation and the Department for Business, Energy and Industrial Enterprise.

Because the conceptual frameworks developed by the research are generic, they have the potential to be applicable in a very wide range of contexts of practice. The findings of the study have implications for management style and leadership within organisations, and for their missions and procedures. The study has implications for the design and support of managers and practitioners working, learning and innovating in any domain, including, for example, teams working in educational institutions such as schools, colleges and universities.

The conceptual propositions from the research are being incorporated into the curriculum of several practice-based MA programmes within the UCL Institute of Education Department of Education, Practice and Society, including the MA in Professional Education and Training, the new MSc in Engineering and Education, and the PGCE (post-compulsory).

Reflective Statement

Introduction

Doctoral-level study was never, until 2011, in my plans. My professional life began in the mid-1970s, soon after completing my humanities degree, with voluntary and temporary part-time teaching in adult education, followed by permanent (and eventually full-time) teaching and curriculum management in adult and then further education. By the mid-1990s I was an experienced practitioner, teaching and managing provision in adult basic skills and access programmes, with solid experience in community development. I had a Teaching Certificate at Level 3, and a Diploma in Adult and Continuing Education from Birkbeck. In general I felt I didn't need to study, and anyway I didn't have the time: my work was also my politics, and it was demanding and totally engaging and absorbing. I would now say my professional development arose, for better or worse, almost entirely through my practice, and through informal discussions with colleagues and friends.

I was persuaded, as a newly-appointed FE college Head of Department, and reluctantly at first, to take an MA module as part of the MA Vocational Education and Training at the Institute of Eduction (IOE) Post-16 Centre in 1997, and then, with support from my college employer, to complete the MA. This changed my attitude to formal professional learning. The material and the teachers challenged and stimulated me, and best of all, it was unexpectedly relevant to my job: I was very excited when I was introduced to the literature on workplace learning, and I wrote my dissertation on Learning Organisation theory in relation to FE colleges, which was awarded a distinction. However, when immediately after this it was suggested by an IOE colleague that I should enrol for a doctorate, my thought was: I'd get bored working on a single subject for so long, and anyway no one would read it, so what was the point? I didn't know about the Ed D at that

time, but also my career in FE was developing – I was HoD of one of the largest Adult Basic Education departments in the country, working for one of the best colleges in London, New Labour's *Skills for Life* initiative was being launched, and I was around this time a member of the DfE's post-Moser Report Technical Implementation Group, the NHS University Skills for Life and Health Reference Group, and the Cabinet Office Social Exclusion Unit's Group on Neighbourhood Renewal.

During this late 1990s period I had also become involved in workplace learning practically through activity within the Workplace Basic Skills Network, and as a result of my department winning contracts to design and deliver workplace literacy, language and numeracy programmes, notably for London Underground Limited.

In 2003 I made a significant change of career direction, and for most of the first decade of the C21st worked as an independent consultant, focussing mostly on Teacher Education and Adult Basic Skills development in workplaces and colleges, but also as a member of a number of research project teams, of which the most significant were Skills for Life in Workplaces led by Alison Wolf and Karen Evans at the IOE, and Formative Assessment in Further and Adult Education, led by Kathryn Ecclestone, for which I worked on behalf of the IOE's National Research and Development Centre for Literacy and Numeracy.

In 2008 I started working as a part-time teacher educator at the IOE contributing to a new pathway for Refugees and Asylum Seekers within the PGCE (post-compulsory) programme. As consultancy work became more precarious following the recession and the change of government in 2010, teacher education became my most significant employment. By 2011 I was a 0.5 employee of the IOE, and it was at this point my line manager suggested I enrol for an Ed D, and this for me was the right time.

The focus of my engagement with the different stages of the Ed D and with this thesis emerged in five ways from this career background: (a) from my experience as an adult educator in non-formal, unaccredited programmes, which developed my interest in informal learning; (b) from my work in further education with its focus on vocational rather than academic purposes for learning; (c) from my experiences working in partnership with different employers in very different contexts to provide learning opportunities for employees while they were at work; (d) from my MA VET, as explained above; and (e) from my work in teacher education, as a result of which I had come to see teaching expertise as something gained primarily through informal practice, rather than through formal initial training: which is to say, I had come to see teacher education as an example of the broader field of workplace learning.

My experience of the Ed D

The combination of these five themes suggested a study of learning through workplace practice, with a particular focus on the informal aspects of practice itself and of the practice environment. I took two different approaches to this overall focus in the earlier stages of the Ed D: my Foundations of Professionalism assignment argued for a practice-based focus for teacher education; for the Methods Of Enquiry 1 and 2 module assignments I designed and implemented a study investigating how highly-experienced practitioners in a range of domains, including teaching, perceived how they themselves had acquired their expertise (Derrick 2012a, 2012b). These studies suggested that, in terms of the actions individual practitioners themselves could take to develop and enrich their professional learning (irrespective of the environmental and organizational factors supporting or inhibiting them in their learning), there are generic techniques, relevant across different domains and occupational sectors, through which individuals in any context can optimise their learning through work.

In the second stage of my doctorate, the Institution-Focussed Study (IFS), I investigated employee learning in one research-intensive and innovation-focussed workplace. This organisation had few direct connections to the formal world of education, and made almost no explicit references in its work procedures and documents to either teaching or learning. It exemplified (a) a central business and practice focus on innovation, (b) a relatively stable organizational history over a very long period (including the presence of many key staff who had been with the organization for most of their careers, and through several fundamental changes in the technological environment in which the organization operated), (c) the apparent fact that, although learning and teaching were clearly of paramount importance in the achievement of its business goals, they were largely invisible, or rather perhaps completely embedded, in the long-established and deep-rooted culture, norms and procedures of the organization, and (d) an organisational strategy of recruiting high-performing graduates from a range of different disciplines and work backgrounds (Derrick 2014). My IFS raised interesting insights relevant to the training and ongoing development of professional practitioners, including teachers, and in particular suggested that induction to work should be conceived less as a simplistic process of knowledge transfer, and more a process of training individuals and teams in the planning and implementation of their own professional and career development. The study suggested that major potential resources for this process of capacity-building are both the formal and informal aspects of the experience of work itself.

Another finding of my IFS was that the organisation being investigated was strongly 'expansive' (Fuller and Unwin 2004). This finding suggested that there was a link between the organisation's expansive character and its explicit strategic focus on innovation. Furthermore, as part of this study, I came into contact for the first time with research literature on innovation within

organisations, which highlighted the paucity of convincing accounts of innovation showing how new ideas and practices can emerge from practice itself.

There were three further significant outcomes of the IFS for the development of my thinking as a researcher in the field of workplace learning: the first was that I realised more clearly that to focus exclusively on expertise in my thesis, as opposed to practice in the round, would be to abstract knowledge and skills from their implementation and their context: it suggested I should focus on practice as the arena within which practitioner agency and the contextual constraints of specific workplaces interplay and are developed and shaped. Secondly, as a result of interviewing practitioners whose work was explicitly concerned with innovation, I began to see that learning and innovation were closely linked, and to see that innovation was both a more complex and more ubiquitous aspect of practice: that from a phenomenological perspective, practice is never repeated, but rather continually renewed; innovation, in this sense, is something all practitioners engage in, rather than just specialist innovators. The third key insight from the IFS was the significance for both learning and innovation of the informal aspects of workplace practice: social relations, trust, autonomy, and motivational factors, as well as formal procedures, norms, policies and rubrics.

My earlier Ed D studies suggested that (a) previous studies of innovation and workplace learning have tended to focus mainly on formal aspects of work that are easily measurable and susceptible to metrical analysis, and that this is a significant deficiency in the research literature, and (b) there is evidence that the informal aspects of workplace culture, practices and procedures in fact contribute significantly to learning and to success in innovation.

My thesis brings together four strands of my earlier professional activity: firstly, I am professionally interested in the learning that teachers do as a direct result of their work, through

reflective practice for example. Secondly, I have been professionally and practically involved for 20 years in the workplace as a site for significant adult learning. This interest was further enriched when I joined the Department of Education Practice and Society at the Institute of Education, for which workplace and professional learning in various forms is a major focus of work. Thirdly, as a reaction to my experience over many years of being subjected to simplistic and reductive outcome measurement frameworks as a teacher in Further, Adult and Vocational Education, I have long been interested in trying to understand better those aspects of the experience of learning and working within education which are not easy, and perhaps impossible, to measure, in the belief, based mostly on experience rather than formal research, that they are significant, important, and perhaps critical for high quality learning, productivity and innovation. Fourthly, the earlier stages of my Ed D have all contributed to the development of my thinking and practice as a researcher in the field of workplace practice. All these strands are integrated into this thesis study, and have been extended and developed by it.

In terms of specific areas of learning which will support my work as a researcher and teacher in the future, the whole Ed D, and especially the thesis stage, have helped me develop and mature my expertise in qualitative research methods, and in my epistemological understanding of the ways in which qualitative research findings have validity: the other side of this coin is the extent to which quantitative research often makes unwarranted claims to validity. Secondly, I have learned that academic writing is a practice in itself, and I have become much more professional about writing as a professional task rather than an exercise in self-expression (though it is that too). Thirdly, I have been able to use the Ed D as an opportunity to become more familiar with important work in the literatures relevant to learning and innovation through practice, and the way they are interrelated with each other, and with a range of different fields of theory and practice. Finally, my

participation in the Ed D has enabled me to become familiar with a range of relevant conceptual frameworks and analytical tools to support future research activities in the field of learning through practice, and at the same time to support my teaching within the Department of Education, Practice and Society.

Acknowledgements

Grateful thanks to:

My supervisors: Alison Fuller and Lorna Unwin who have, among many wonderful things, taught me that writing, too, is a practice, mostly learned by getting on with it rather than just thinking about it;

My interviewees and their colleagues at 'Westbridge College' and 'TLZ R&D';

My teachers and fellow-students in the September 2011 cohort of the Ed D;

My colleagues at UCL Institute of Education, particularly in EPS and within the PGCE (post-compulsory) team, and especially Lynne Rogers and David Guile, for their support, advice and encouragement;

Other encouragers, sounding boards, and critical friends, many of them over several decades: Percy Aggett, Simon Allman, Louise Barnden, Mike Betts, Chris Bradey, Chris Brown, Ivan Cardwell, Steve Donnelly, Sam Duncan, Bridget Fagan, Caroline Fagan, Charlie Fagan, Reuben Fagan, Fiona Frank, Mick Freeman, Tony Gallagher, Julia Gay, Julia Jeanes, Jim Grant, Gwyn Hughes, Urmi Joshi, Hilary McQueen, Declan Molloy, Andy Nash, Maurice Neville, Jitka and Mark Palmer, David Powell, Tom Schuller, Amy Stride, Alison Tomlin, Alan Tuckett, Bill Wallace, Nick Wells, Cal Wetherald, and Morris Williams;

My fellow music and tennis practitioners: both contexts have been convivial and productive labs for researching tacit pedagogy through collaborative practice, always accompanied by robust and continuous peer review;

Finally, for supportive entanglement for the longest time, all my love and thanks as always to Bridget. Your turn now!

Contents

Chapter 1 Introduction

From an educational point of view, the workplace is an important and generally overlooked site. It offers perspectives on learning which can be harder to perceive in schools, colleges and universities, in which the formal, purposeful and explicit usually obscure the informal, unintentional and tacit aspects of teaching and learning. In drawing attention to the always present informal dimensions of practice, workplaces point towards a broader conception of learning, in which what goes on in schools, colleges and universities is revealed as the tip of a largely submerged iceberg. Furthermore, sociological research on workplace practice suggests that learning informally through practice is as significant as formal learning for individuals and organisations (see for example, Coffield 2000, Eraut 2000); and that focussing on the way individuals and teams learn through their work may also help us understand and optimise work processes that lead to sustainable innovation. This possibility is the primary motivating focus of the study reported on in this thesis.

Much of the research literature on the workplace as a site for learning focusses either on questions about the extent to which, and about the ways in which, workplace practitioners are learning, or alternatively about the extent to which the organisation and cultures of the workplace support learning. By concentrating on the informal and tacit dimensions of work and activity, this study aims rather to focus squarely on practice itself as a lens for illuminating how change and innovation occur as integral aspects of the day-to-day engagement of workers (who are referred to in general in the study as practitioners). In taking this approach, the study hopes to provide something hitherto lacking in much of the academic literature: that is, a more satisfactory socio-material account of change and innovation in workplace practice.

In order to achieve these aims, the study's main research question and sub-questions, which are discussed and justified in chapter 2 below, are as follows:

- How do practitioners in high-performing organisations make use of informal modes of learning and team-working to support innovation?

Three subsidiary questions were also chosen:

- What informal features of organisational culture, work processes and strategic orientation support innovation in two high performing organisations?
- How do these features interrelate with formal features of these organisations?
- How are learning, innovation and practice interrelated conceptually?

1.1 Focus and detailed rationale for the research

This study (a) uses a comparative analysis of two high-performing organisations so as to identify aspects of workplace culture, work processes, and strategic orientations which are associated with innovation; (b) focusses on the informal and tacit aspects of work processes in these two organisations so as to examine the interplay between practitioners as purposeful agents and the contingencies of the context within which they work; and (c) uses qualitative data from these organisations to develop a conceptual understanding of the links between practice, learning and innovation which builds on and extends previous research. This introductory chapter provides a rationale for the study, in which I start by justifying its specific focus in relation to the context of other research into workplace learning, situate it within the trajectory of my development and interests as an educational practitioner and researcher, and how it has developed from the earlier

stages of my Ed D programme. I then go on to present brief descriptions of the two organisations selected as case studies for this investigation. The final section of chapter provides an outline of the structure of the thesis as a whole.

I believe this investigation is worthwhile for three main reasons: firstly, learning, innovation and practice are complex concepts, especially in relation to contexts which are highly dynamic and rapidly changing, and the study aims to enrich the evidence base for our understanding of them; secondly, the study aims to provide insights into ways the two organisations that were investigated might develop and improve; and thirdly, these insights may be applicable in other contexts and organisations, one of which is teaching, the practice of which I have been engaged professionally for over 40 years.

I have worked as a teacher in a range of different formal contexts since 1975, until 2001 in adult and further education, then as a professional educational consultant and educator working in the post-compulsory sector, and for the last 10 years as a teacher educator based in Higher Education. The focus of this thesis emerged in five ways from this background: (a) from my experience as an adult educator in non-formal, unaccredited programmes, which developed my interest in informal learning (b) from my work in further education with its focus on vocational rather than academic purposes for learning (c) from my experiences working in partnership with different employers in very different contexts to provide learning opportunities for employees while they were at work (d) from my MA in Vocational Education and Training, taken 20 years ago at the Institute of Education, which brought me into contact for the first time with the research literature on workplace learning, and (e) from my work in teacher education, as a result of which I have come to see teaching expertise as something gained primarily through informal practice,

rather than through formal initial training: which is to say, I have come to see teacher education as a particular case within the broader field of workplace learning.

The combination of these five themes suggested a study of learning through workplace practice, with a particular focus on the informal aspects of practice itself and of the practice environment. I took two different approaches to this overall focus in the earlier stages of my doctoral programme: for the Methods Of Enquiry 1 and 2 module assignments I designed and implemented a study investigating how highly-experienced practitioners in a range of domains perceived how they themselves had acquired their expertise (Derrick 2012a, 2012b). These preliminary studies suggested that, in terms of the actions individual practitioners themselves could take to develop and enrich their professional learning (irrespective of the environmental and organizational factors supporting or inhibiting them in their learning), there are generic techniques, relevant across different domains and occupational sectors, through which individuals in any context can optimise their learning through work.

In the second stage of my doctorate, the Institution-Focussed Study (IFS), I investigated employee learning in one research-intensive and innovation-focussed workplace. This organisation had few direct connections to the formal world of education, and made almost no explicit references in its work procedures and documents to either teaching or learning. It exemplifies (a) a central business and practice focus on innovation, (b) a relatively stable organizational history over a very long period (including the presence of many key staff who have been with the organization for most of their careers, and through several fundamental changes in the technological environment in which the organization operates), (c) the apparent fact that, although learning and teaching are clearly of paramount importance in the achievement of its business goals, they are largely invisible, or rather perhaps completely embedded, in the long-established and deep-rooted

culture, norms and procedures of the organization, and (d) an organisational strategy of recruiting high-performing graduates from a range of different disciplines and work backgrounds (Derrick 2014). My IFS, as hoped, indirectly raised interesting insights relevant to the training and ongoing development of teachers: in particular, that induction to work should be conceived less as a simplistic process of knowledge transfer, and more a process of training individuals and teams in the planning and implementation of their own professional and career development. The study suggested that major potential resources for this process of capacity-building are both the formal and informal aspects of the experience of work itself.

Another finding of the IFS was that the organisation being investigated was strongly 'expansive' (Fuller and Unwin 2004). This term refers to a tool for analysing and assessing organisations about the extent to which opportunities for learning (either purposeful or incidental, formal or informal) are created and sustained for their staff. This finding suggested that there was a link between the organisation's expansive character and its explicit strategic focus on innovation. Furthermore, as part of this study, I came into contact for the first time with research literature on innovation within organisations, which highlighted the paucity of convincing accounts of innovation showing how new ideas and practices can emerge from practice itself. Some of this literature is discussed in the next chapter (see for example Brown and Duguid 1991, Schatski et al 2001, Ellström 2010).

There were three further significant outcomes of the IFS for the development of my thinking as a researcher in the field of workplace learning: the first was that I realised more clearly that to focus exclusively on expertise in my thesis, as opposed to practice in the round, would be to abstract knowledge and skills from their implementation and their context: I needed to focus on practice as the arena within which practitioner agency and the contextual constraints of specific

workplaces interplay and are developed and shaped. Secondly, as a result of interviewing practitioners whose work was explicitly concerned with innovation, I began to see that learning and innovation were closely linked, and to see that innovation was both a more complex and more quotidian aspect of practice: that from a phenomenological perspective, practice is never repeated, but rather continually renewed; innovation, in this sense, is something all practitioners engage in, rather than just specialist innovators. The third key insight from the IFS was the significance for both learning and innovation of the informal aspects of workplace practice: social relations, trust, autonomy, and motivational factors, as well as formal procedures, norms, policies and rubrics.

Specifically, my earlier Ed D studies suggested that (a) previous studies of innovation and workplace learning have tended to focus only on formal aspects of work that are easily measurable and susceptible to metrical analysis, and that this is a significant deficiency in the research literature (for example, see Jensen et al 2007), and that (b) there is evidence that the informal aspects of workplace culture, practices and procedures (elaborated in more detail below and in later chapters as 'tacit pedagogy') in fact contribute significantly to learning and to success in innovation.

To sum up the genesis of this thesis, the final stage of my Ed D, it brings together four strands of my earlier professional activity: firstly, having been a teacher educator for the post-compulsory sector for the past ten years, I have become particularly interested in the learning that teachers do as a direct result of their work, through, for example reflective practice. Secondly, I have been interested in the workplace as a site for significant adult learning since helping to establish an adult basic education programme for the staff of a major transport operator in the late 1990s, and becoming an active member of a national network to support workplace basic skills development for employees during the same period. This interest was further enriched when I joined the Department of Education Practice and Society at the Institute of Education, for which

workplace and professional learning in various forms is a major focus of work. Thirdly, as a reaction to my long experience of being subjected to simplistic and reductive outcome measurement frameworks as a teacher in Further, Adult and Vocational Education, I have long been interested in trying to understand better those aspects of the experience of learning and working within education which are not easy, and perhaps impossible, to measure, in the belief based, on my experience, that they are significant, important, and perhaps critical for high quality education. Fourthly, the earlier stages of my Ed D have all contributed to the development of my thinking and practice as a researcher in the field pf workplace practice. All these strands are integrated into this thesis study.

In planning my thesis, therefore, I wanted to look at practice in the round, to focus on the links between learning and innovation, and to look in particular at the way informal aspects of workplace life impacted on these practices, in what I propose to designate as 'tacit pedagogy'. To highlight innovation and innovativeness, I wanted to look at two different types of organisation, one for which innovation was its explicit business, and the other for which this was not the case. These considerations suggested that a qualitative comparison between two quite different organisations focussing on the 'tacit pedagogy' operating in each, and looking primarily at the informal interactions between individuals, teams and the organisation as a whole, might provide insights into how organisations can further improve their activities in relation to employee learning, production and innovation.

The process of deciding on these two organisations is discussed further in Chapter 3. The first organisation researched in this study is a high-performing (I discuss this term in chapter 3) general further education (FE) college (one rated as 'outstanding' by OFSTED), which I am referring to as Westbridge College (WBC). The second is TLZ R&D, the same engineering company I

researched in my IFS, which I chose because my earlier study suggested that there is a link between the company's explicit strategic business objective of technological innovation and its largely implicit achievement of 'expansiveness' in relation to support for staff learning. Everything possible has been done to preserve the anonymity of these two organisations and of the research participants. This issue is discussed further in Chapter 3.

I now present brief descriptions of these two organisations.

1.2 Descriptions of the two case study organisations

1.2.1 Westbridge College (WBC)

Westbridge College is a medium-sized general further education college situated within but near the edge of a major conurbation, and operating on two main campuses four miles apart. It was originally established by the local authority and opened in 1965, with two departments offering 10 full-time courses and 41 part-time courses, and by the 1970s it was enrolling about 4000 students per year. It became an autonomous corporation following the Further and Higher Education Act of 1992, and has since then been a non-profit corporation run by a Board of Governors. By 2015 it had 11 departments, 99 full-time courses and 138 part-time courses, and enrolled over 10000 full- and part-time students. It offers courses in 22 curriculum areas, from pre-entry through to first degree level 6, including bespoke training and education courses and 28 different apprenticeship programmes, catering for 600 apprentices working for 400 local and regional employers. Over 800 students progress each year to university degree programmes, as well as 280 students on HNC and HND programmes. The college's most recent full inspection was

in 2008, when it was rated as 'outstanding' by the government Office for Standards in Education, and this judgement, the best possible, was confirmed in subsequent monitoring visits in 2010 and 2011. The college was awarded 'Beacon' status by the Association of Colleges in 2009; and the achievements of its students rank as higher than most other colleges in their region. Remarkably, in its 53 year history, the college has only had 5 principals, the present incumbent having been in post since 2007 (College publicity accessed 31-03-18).

Three teams of Westbridge College teachers volunteered to participate in the study, specialising in Hair and Beauty, Motor Engineering, and Humanities. Each of these teams consisted of 3 teachers, one of whom was the designated team leader. Team leaders, for whom teaching is also the majority of their work, are known in the college as Section leaders, and their teams consist of Course team leaders (CTLs), all of whom teach, but also co-ordinate the work of other teachers making up the subject teaching teams. Section leaders work to Heads of Department, who report to members of the Senior Management Team of the college. The three team leaders were all highly experienced specialist in their fields, though one had only worked at WBC for two years, after many years of similar work at other colleges. All the team members were similarly experienced, and most had been teaching at WBC for many years. One member of the humanities team was new to the college and to further education, having taught and managed in a secondary school for many years. Another member of this team was young and had only been a teacher for two years. All the members of the Beauty and Motor Engineering teams had substantial industry experience and strong personal and professional links with local employers.

This type of organisation was chosen as a research site in order to facilitate the application of any generic insights and findings on professional and organisational development from the study to teacher education in the further education sector, and because of my personal familiarity with

the sector (though not with this college), which would enable me to make sense of qualitative data more easily. Teaching and learning are central and explicit in every aspect of the operations of colleges such as Westbridge. Furthermore, FE colleges operate at present in a policy and financial context of extraordinary volatility and uncertainty. As a result of this, colleges also often make innovation, and developing the capacity to innovate, a central feature of their organisational development strategies.

1.2.2 TLZ Research and Development (TLZ R&D)

This brief description of TLZ R&D is based on information collected during the interview with my interviewees in this and my previous study (Derrick 2014). Documentary data in the public domain was also gathered from the organisation's website. TLZ R&D is a relatively small division of a very large broadcast-engineering and production corporation, (TLZ), which is partly supported by public funds under the terms of a charter nearly 100 years old. The formal regulation and governance of TLZ as a whole has been the subject of intense political debate over recent years. The R&D division of TLZ is not in any real sense the subject of these debates, and its work is quite unlike the work of the other areas of the company, though there is a direct link between R&D and the provision and development of equipment and technical kit needed to conduct the rest of the company's activities, and, increasingly, in terms of the development of new digital products that enhance the company's broadcast services, and which may have commercial potential, an increasingly significant issue. TLZ R&D's history goes back continuously to the 1920s, and it has played a major role in many of the most important technological developments in broadcasting since that time, both nationally and globally. The organisation as a whole is a household name, but its R&D division has a much lower public profile. In recent times it has developed from being

concerned primarily with terrestrial broadcasting using a wide range of physical hardware, to a major focus on digital and web-based broadcast technology, a transition that hasn't been easy and which is still in some senses in process. However, there have been consistent themes informing its work throughout its history: it has always had an intense research focus on improving signal compression while maintaining quality, it has always been concerned with improving the experience of the users of its technology, and there has always been a strong and explicit sense of public service within the organisation. It has embodied a culture of research and innovation from the start: in this it shares some features of university research departments (for example, its staff are organised for management purposes into 'labs'). It has also always made a virtue of integrating theory and practice: TLZ R&D has always focussed on the technological development of equipment to support the work of actual technicians in other parts of the company, and in the wider industry, enabling them, not just to get their work done, but to develop and improve it continuously. This focus on multi-disciplinary practice, on the needs of actual broadcasters and on the multi-disciplinary and dynamic sphere of cultural production, as well as on theoretical research, is indicated by the convention that TLZ R&D practitioners generally refer to themselves as engineers (Derrick 2014), whatever their original specialist background when they join the company, whether that be mathematics, physics, software development, or indeed a branch of engineering.

TLZ R&D employs about 40 engineers, who are physically located in two centres, one in the south and one in the north of England, known respectively as the South and North Labs, each with its own director. Staff members are known officially as technologists, and work in teams on projects, almost all involving innovation, structured around solving technical problems that arise in designing new products, identified either by the TLZ's strategists or suggested by the engineers themselves as being desirable to advance the corporation's interests and finances. The projects

vary widely in focus, but usually involve software development and computer coding (for a very wide range of applications), signal compression, signal quality enhancement, end-user research, or improvements in the design or specifications of items of broadcasting kit. Projects are led by experienced engineers, and are made up of staff with a range of specialist knowledge, skills and experience it is judged will be needed. Teams often include newly-recruited and inexperienced practitioners: project team-working is a major element of the induction process for new staff (Derrick 2014), and thus the project leader's role has a pedagogical dimension, though this is largely implicit.

Projects are set up by the TLZ R&D managers in consultation with their teams. A typical project might initially be scheduled to last for two years, but it is understood that these plans may need to change. The members of one of these project teams were recruited for this study, comprising a team leader and three engineers. Although this team was based in the South Lab, one member was physically located in the North Lab, 200 miles away, and one of the other members in fact relocated to the North Lab during the research period. This was a fairly common arrangement, and in practice almost irrelevant to the degree or quality of the involvement of those team members in the project work: this issue is discussed later. The members of the team had different specialist backgrounds and years of experience in the company and in the industry, but the project leader was substantially more experienced, and had also led other project teams in the past.

This section has described the organisations which are the subject of the two case studies which are the focus of this study. I now move on to outline the structure of this thesis.

1.3 How this thesis is organised

This introductory chapter is followed in Chapter 2 by a review of academic literature relevant to the focus of my study. Following a brief introduction, this chapter is divided into four further sections: section 2 consists of a discussion of Beckett and Hager's important conceptual distinction between 'standard' and 'emergent' paradigms for learning (2002), which offers a powerful argument for the significance of the workplace as a major site for learning. The third section unpacks and elaborates approaches to workplace learning within the emergent paradigm, under the sub-headings first of practice, in which I introduce the idea of 'tacit pedagogy', and then of the workplace as an environment for learning and innovation. The next section examines the literature on innovation in the workplace and through practice: this section has three sub-headings: organisation-driven innovation, employee-driven innovation, and practice-based innovation. The chapter concludes by stating the formal research questions articulated for this study, and locating these in the previous discussion of the literature.

The third chapter presents and justifies the methodological approach taken in this study, which connects it to the overall purpose and focus of my investigation. It discusses the evolution of my methodological thinking, the approach I have taken to design and sample selection, to data-collection, and finally to analysis.

Chapter 4 presents the findings of the study, first in relation to Westbridge College, and then to TLZ R&D. This is followed by a synthetic discussion, in Chapter 5, which discusses in turn five themes that emerge from the findings, focussing on the similarities and differences between the findings related to the two case studies. It then proposes an explanatory account of this analysis in terms of the conceptual frameworks referenced in the literature review. The final chapter presents the overall conclusions of the study and relates these to the original research questions. It

then briefly discusses the limitations of the study, future directions for related research, and the impact of the study on my professional practice.

A word needs to be said at the outset about terminology. The overall focus of this thesis is on learning, innovation and practice, and hence I make use of the word 'practitioner' for the subjects of these learning processes. This term connotes engagement in 'practice', a term applicable to any context of purposeful activity. All the 'practitioners' who contributed to this study are in fact 'employees', but for me, 'practitioner' is preferable to this or other terms such as 'professional' or 'worker', as these have strong specific social, cultural and political connotations which can distort discussions about learning (for an extended discussion of this, see for example Derrick 2013). 'Employee' in this sense is a subset, or a particular case, of the more general category of 'practitioner'.

Following this introduction to the thesis, I now move on to review relevant literature in Chapter 2.

Chapter 2: Literature review and development of a conceptual framework for the study

2.1 Introduction

This study focusses on the informal factors that affect learning and innovation in workplaces. It starts from the position that:

> '*working, learning and innovating are closely related forms of human activity that are conventionally thought to conflict with each other. Work practice is generally viewed as conservative and resistant to change; learning is generally viewed as distinct from working and problematic in the face of change; and innovation is generally viewed as the disruptive but necessary imposition of change on the other two.*' (Brown and Duguid 1991)

In this study I explore the ways in which informal aspects of workplace practice may help provide more accurate descriptions of the links between workplace practice, learning and innovation. Relatively little is known about how informal aspects of work situations, provisionally denoted here as 'tacit pedagogy' (a concept elaborated more fully in chapter 5), contribute to learning and innovation as integral parts of workplace practice. By 'informal aspects' I mean generally unarticulated cultural and behavioural norms, the social and cultural aspects of leadership, interaction, and practitioner identity within teams, and the tacit elements of knowledge and expertise and practice.

The purpose of this chapter is to situate the study within the history and landscape of thinking and research on learning and innovation in the workplace, and to provide a rationale for its key research questions, design and methodology. It starts by discussing workplace learning within

conceptions of learning overall, using Beckett and Hager's (2002) identification of 'standard' and 'emergent' paradigms of learning. Theirs is an important distinction for this study, because they argue that workplace learning is indissolubly embedded within practice, and that this view is essentially incompatible with the 'standard' paradigm (Beckett and Hager 2002). For them, the 'emergent' paradigm (now, nearly two decades on, well established rather than emergent) is a much-expanded perspective within which standard paradigm modes of learning are revealed as specific cultural behaviours embodied in characteristic institutional and procedural structures, and which fail to account for the significant formal and informal learning that takes place outside of such institutions. The 'emergent' paradigm is largely defined through the association of learning with practice, and foregrounds informal learning, tacit and embodied knowledge, and learning through collaborative activity (Beckett and Hager 2002). However, innovation as a dimension of workplace practice is hardly mentioned by Beckett and Hager: the present study aims to enrich their analysis in this respect.

Section 2.2 of this chapter provides a critical comparison of the standard and emergent paradigms of learning. Section 2.3 locates this study within what Engeström (2008) describes as a 'new wave' of interdisciplinary research on learning through practice, in which 'organisational and cultural contexts are taken as integral constitutive aspects of the phenomena to be explained' (Engeström 2008, p4). I do this by examining research literature on workplace learning and practice under two headings: Practice and 'tacit pedagogy', and Workplaces as environments for innovation and the evolution of practice. The focus of section 2.4 is on a relatively distinctive aspect of this study: innovation as a potential product and/or strategic aim of workplace practice. Finally, section 2.5 presents and very briefly discusses the research questions selected for this study, which derive from the discussions and analysis in the earlier sections of the chapter.

2.2 The 'standard' and 'emerging' paradigms of learning

There has been a major conceptual development in theorising and researching workplace learning in recent years, according to Beckett and Hager (2002), who describe this shift in terms of two contrasting paradigms of learning, which they designate as 'standard' and 'emergent'. This section consists of a comparative discussion of these two paradigms, and aims to provide a broad historical and intellectual context for this study.

Hager (2011) argues that the 'standard paradigm' of learning started with the predominantly behaviourist theories of Watson (1913) and Skinner (1948), but that cognitivist theories emerging later in the C20th shared many of the perspectives of behaviourism: they saw learning as an individual and primarily psychological process; they paid attention only to aspects of performance that could be observed and measured, and they assumed that improved performance was a technical problem needing only to draw on codified knowledge. They generally assumed that social, cultural, physical and organisational factors were largely irrelevant to effective processes of learning, which were seen as being completely comprehensible independent of context (Hager 2011, p19). These theories meshed well with human capital theory and with deeply-embedded assumptions about the appropriate organisation and roles of schools, colleges and universities. They have had strong traction and widespread currency in policy development, as they see learning, knowledge and expertise in positivist terms: suggesting that expertise can be conceived as being made up of a collection of specific and generic 'skills' which can be 'acquired' by learners (Sfard 1998), and which themselves can be broken down into lists of 'competences'. This theoretical conception also assumes that skills and competences can be taught separately from the setting in which they are to be applied, and unproblematically 'transferred' between contexts once

they have been 'acquired' by learners (eg Salomon and Perkins 1989, Sfard 1998 and Paavola et al 2004).

In sum, the 'standard' paradigm of learning (Beckett and Hager 2002) makes a number of problematic assumptions. They are, firstly, that knowledge is static, universal, independent of context, codified, and founded on philosophically-derived 'truths'; secondly that explicit analytical knowledge has high status: uncodified or tacit knowledge and practical experience in themselves have little significance for the organisation of learning. Thirdly, learning comes before and is separate from the application of knowledge, and even more from innovation. The fourth is that approved, codified knowledge is 'transmitted' to learners by teachers, and this takes place in specialised institutions established exclusively for this purpose, which are isolated from the locations in which the knowledge content of learning is applied within practice. Furthermore, learners are always seen as being in deficit in relation to knowledge (due to age or ignorance); learning is conceived as a largely passive, individualistic and psychological process of 'receiving' approved and explicit knowledge; learned knowledge is 'stored', as it were, in the cerebra of individual, disconnected learners; and finally, learning always comes before practice and therefore is something only 'apprentices' do: practice and innovation are the exclusive preserve of experienced practitioners, who are assumed to have completed their learning.

Since the mid C20th, these theories have been challenged by socio-cultural theorists working within the new paradigm (Hager 2011). Pioneers of this perspective include Lave (1988), (Lave and Wenger (1991) and Brown et al (1989). These theorists introduced anthropological and dynamic perspectives into thinking about learning and knowledge, arguing that human development is less the product of formal education, more of the totality of lived experience:

> '*Everyday activity is, in this view, a more powerful source of socialisation than intentional pedagogy….Practice theories thus challenge conventional assumptions about the impact of schooling on everyday practice.'* (Lave 1988, p14)

Lave goes on to argue that it is not 'verbally transmitted, explicit, general knowledge….that makes cognitive skills available for transfer across situations' but rather that 'knowledge-in-practice, constituted in the settings of practice, is the locus of the most powerful knowledgeability of people in the lived-in world' (Lave 1988, p14). Brown and his colleagues, building on this, emphasise the essential interwovenness of learning and experience:

> '*The activity in which knowledge is developed and deployed, it is now argued, is not separable from or ancillary to learning and cognition. Nor is it neutral. Rather, it is an integral part of what is learned. Situations might be said to co-produce knowledge through activity.*' (Brown et al 1989, p32)

Research on workplace learning within the 'emergent' paradigm argues that: learning is a dimension of social practice (Lave 1988, Brown et al 1989) and that it is 'situated' and grounded in specific cultural contexts of practice (Lave and Wenger 1991, Lave 1993) and is therefore always a potential product of 'everyday work' (Littlejohn et al 2016); that different contexts provide 'affordances' for learning through practice (BIllett 2001a), to the extent that these contexts are 'expansive' or 'restrictive' (Fuller and Unwin 2004, 2006); that contexts and knowledge are not themselves static but dynamic, and learning inevitably reflects this (Lave 1993). The researcher's position, in this view, is far from being a secure, objective platform, but unavoidably 'in the wild' (Hutchins 1995), or alternatively 'in the swampy lowland where situations are confusing 'messes'' (Schön 1983, p42). Transfer of knowledge from one context to another, is anything but simple and straightforward: rather, it is a complex and problematic process, requiring active

'recontextualisation' by practitioners (Guile 2014), precisely because codified skills and knowledge are highly context-bound (Boreham 2000). Learning is seen as taking place everywhere and continually, both formally and informally, (Schön 1987, Lave 1993, Engeström 2001, 2011), and can be purposeful or accidental or both (Coffield 2000, Eraut 2000, Ellström 2011). It is seen as an intrinsically social rather than individualistic process, and knowledge is located, shared and developed within 'communities of practice', made up of individuals with varying levels of expertise and knowledge (Brown and Duguid 1991, Wenger 1998). It assumes that expertise includes tacit as well as explicit (codified) knowledge (Polanyi 1966, Jensen et al 2007), 'know-how' as well as 'know-that' (Ryle 1949); and is embodied and physical as well as intellectual (Merleau-Ponty 1945, Law 2004). Finally, teachers are seen in this view as more experienced practitioners (Engeström 2004), who support learning through the use of techniques such as demonstration (eg Lave and Wenger 1991), 'scaffolding' (Vygotsky 1978), and the provision of ongoing formative feedback on practice-based activities and tasks, which are designed both to support learning and to achieve practical outcomes and products, rather than just the transfer of propositional knowledge.

The emergent paradigm constitutes what is essentially an interpretive view of learning: it attempts to see learning 'as it is', uninfluenced as far as possible by cultural biases or scientific pre-conceptions on the part of the observer. This has resulted in frameworks for thinking about learning which aim to be as broad and inclusive as possible: in relation to context, for example, Lave and Wenger (1991) argued that all learning consists of movement from the periphery towards the centre of a broadly-conceived 'community of practice', arguing that this is true of any formal or informal learning, and can take place in any context: in school, college, office or craft workshop, as a hobby or as self-help. Ryle (1949) also, in critiquing positivist and behaviourist conceptions of mind and of learning, argued that aspects of human consciousness such as volition, motivation,

sensation, imagination, and character dispositions all need to be taken account of in accounts of learning for any purpose, and indeed of experience as a whole.

Donald Schön (1983) provides an explicit critique of the standard paradigm, explaining why he sees 'practice' as the key to a more accurate picture of learning at and through work, and introduces a key concept that aims to illuminate the complexity of the human activity of practice: 'reflection-in-action'. This concept brings the practitioner's capacities, dispositions, motivation, previous knowledge and their experience together with the resources of their working environment (which may include their peers) to bear on their immediate tasks; it assumes instability and change rather than stasis in these contextual elements; furthermore, it allows for the possibility that knowledge can change, and thus can also account for innovation arising through practice. This concept will be discussed in more detail later in this chapter.

The emergent paradigm perspective avoids prioritising abstract knowledge in its conception of learning, and instead is based on a dynamic view of all human activity as 'practice', through which culture, learning and production are enacted continuously (Brown et al 1989, Hutchins 1993, Schatski et al 2001). From this perspective earlier conceptions such as school-based learning, workplace learning or informal adult learning can be seen as specific examples of learning through practice, and in which the formal curriculum is only one of many social, cultural and intellectual factors contributing to the learning that actually takes place. Learning is now seen as an integral element of all human activity, rather than a series of discrete events only occurring at specified times and locations. Most importantly for the concerns of this study, a practice-based and dynamic perspective on human activity allows for a realistic and materialist account of innovation and change, though interestingly Beckett and Hager do not provide such an account (2002).

The strengths of this focus on practice are (a) that it avoids the essentialism of dividing human lives and activity into separate compartments: childhood, youth, adulthood; learning, playing, working; (b) that it recognises human activity as dynamic and understands that practice develops and changes over time, and thus allows us to theorise and account for innovation; and (c) that it allows us to provide accounts of practice in team-working contexts that involve group learning and distributed cognition (Hutchins 1993). In the context of workplace learning this is particularly helpful as trying to distinguish definitively between learning, innovation and innovativeness in and across different contexts of practice, such as salaried employment, temporary contract work, subsistence labour, voluntary work, internships, household work, sport, creative activities, gardening, etc is probably futile. The emergent framework consists therefore of a triangle of continuously interacting elements: practice, which provides the occasion and the overt purpose for learning; context which is both unique and dynamic, and which provides both support and constraints for learning; and practitioners, both individual and in groups, who bring knowledge, expertise, dispositions both helpful and unhelpful, and unique experiences and emotions, all of which are brought to bear on each situation, and affect the outcomes.

This detailed account of the different perspectives on learning offered by the standard and emergent paradigms is an important part of justifying the context and pertinence of this study, because even though the emergent paradigm as described by Beckett and Hager (2002) is now represented by a mature body of academic theory and research, its implications have so far had little impact on policy thinking or on popular assumptions about the nature and organisation of learning. Some possible explanations for the continuing hegemonic dominance of standard paradigm assumptions about learning in policy on education, at least in the West, are offered by James et al (2012) and Derrick (2013).

We now look in more detail at accounts of workplace practice and innovation within the emergent paradigm.

2.3 Workplace learning within the emergent paradigm

2.3.1 Introduction

Writers on organisational development focus on workplace learning if they see it as contributing to improved organisational productivity and efficiency, or to innovation. This literature can be categorised by the extent to which it is aligned to the standard or emergent paradigms of learning. Scientific Management (Taylor 1911), for example, embodies a behaviourist approach to the role of learning within organisations, and Human Capital Theory (Becker 1967) a product-oriented view of learning and knowledge as well-defined and homogeneous entities convenient for mathematical economic modelling: both are strongly aligned to the standard paradigm. Barley (1996) discussing research on the historic changes in work and organisations over the past forty years, argues that:

> '*Early organisational theorists were committed to seeking general principles of organising; when it was necessary to talk about work, they turned to abstractions….Over time, most sociologists of work and occupations also turned to large-scale quantitative studies that focussed on such issues as social stratification and occupational prestige….the combination of social and academic trends has led us to a situation where we know more about yesterday's work than we do about today's.'* (Barley S. in Orr 1996, pp xi-xii)

The organisational development theorists Argyris and Schön (1974, 1978), on the other hand, were among the earliest exponents of the emergent paradigm within this literature.

Research work within the emergent paradigm asserts the centrality of learning and innovation as dimensions of human activity in general, including specifically human activity as part of work (understood very broadly, and including all the examples mentioned in the last paragraph). This suggests that practice provides not just affordances (Billett 2001a, 2001b) or opportunities for development, but itself acts as a medium or conduit for both learning and innovation.

One signifier of the growing influence of the emergent paradigm is that the literatures on workplace learning and on organisational development can now be seen to be converging. For example, both areas of research gradually began to distinguish organisational from individual learning: earlier models had treated organisational learning as the technical sum of individual learning within an organisational context. To begin with these were still technocratic accounts, with organisational learning being seen in purely rationalist, analytical and planning terms, and individual learning as a matter of identifying necessary skills and making appropriate formal training available. Later these strands took on board the importance of the culture of workplaces, which led to thinking on the one hand about organisations as 'self-designing systems' (Hedberg et al 1986), and on the other about the informal and tacit components of workplace life and culture as providing support for, or barriers to, individual learning.

This section starts by reviewing literature on the role of 'tacit pedagogy' within practice and then looks at overviews of workplaces as environments for learning and the evolution of practice.

2.3.2 Practice, 'tacit pedagogy' and 'entanglement'

'Tacit pedagogy' is proposed as a generic term for key aspects of practice ignored by the standard paradigm, due to their resistance to clear identification and codification, to being abstracted from their context, and to being 'pinned down' in a static model of practice. These, the literature suggests, are essential elements of a dynamic and developmental account of practice, in which reflection, review and learning, mostly informal, is an integral feature and in which innovation is *always* a potential outcome (Edwards 2010, Gherardi 2012). They include 'Doing, Using and Interacting' modes of knowledge and learning (Jensen et al 2007), the 'tacit dimension' of practice (Polanyi 1966), and the continual review of practice through reflection, mostly informal, by practitioners (Schön 1983, 1987, Edwards 2010). Guile's (2014) concept of 'recontextualisation' provides a practice-based account which incorporates each of these earlier concepts. These will now be very briefly discussed.

Jensen et al (2007) posit two ideal modes of learning and innovation: Science, Technology and Innovation' (STI) and 'Doing, Using, Interacting' (DUI), the first broadly dealing with codified and formal aspects of practice, explicit structures, rules and procedures, documents, rubrics, etc, and the second more informal aspects, including workplace cultures and social norms, the social and cultural aspects of leadership, interaction, practitioner identity within teams, and the tacit elements of knowledge and expertise. The key medium of DUI, it follows, is informal interaction between workplace colleagues: Orr (1996) argues, for example, in his study of the work of photocopier technicians, that even technical knowledge (STI-mode) should be seen as a socially distributed resource, shared and developed primarily through an oral culture:

> *'Viewed from this perspective, the technicians' war stories become texts, not only for the ethnographer….but for the technicians themselves'* (Barley S. in Orr 1996, p xiii)

Littlejohn et al (2016) also show how the sharing of 'war stories' can be a key feature of self-managed learning as part of the practice of finance professionals. I shall argue later in chapter 5 that even these highly informal texts (which may not even be written down), at once both narrative and analytical, are significant as representations of practice through which learning and innovation can take place.

Clearly, therefore, informal aspects of practice need to be taken account of: however, to try to delineate and distinguish clearly between the 'formal' and 'informal' can be seen as a standard paradigm trait: Colley et al (2003) argue that seeing 'formal', 'informal' and 'non-formal' types of learning as discrete is 'to misunderstand the nature of learning', as they are 'attributes present in all circumstances of learning' (Colley et al 2003). This is an important point: the various types of learning and aspects of practice, whether 'STI' or 'DUI', whether formal, informal or non-formal, are according to this view, '*entangled*', a key term for this study which will be expanded on later in this section.

The emergent paradigm view is that learning, knowledge and practice always have a 'tacit dimension' (Polanyi 1966), whatever the context. Evans and Kersh (2004) argue that tacit skills and knowledge, often brought from outside and unrecognised or unacknowledged by the formal context in which they are being used, are a key element in making learning sustainable:

> '*Although many valuable skills are acquired through the workplace and formal education, considerable learning also results from a range of life experiences, in home and family settings, engaging in volunteer activities and overcoming various setbacks in life. Such skills are often tacit in nature and become codifiable only through their deployment or recognition in a relevant context or environment.*' (Evans and Kersh 2004, p65)

Evans et al (2004) also see tacit skills as critical in underpinning the complex process of 'recontextualising' skills learned in one context for use in another (Guile 2014), a process the standard paradigm treats as the unproblematic 'transfer of skills'.

Guile (2014) sees 'recontextualisation' not just as a one-way process through which the newcomer's previously acquired knowledge is moulded and adapted to fit the new situation, but as dialectical: a process through which knowledge from outside also contributes to the continuous re-creation of practice and to innovation. Guile's view, discussed in more detail below, is strongly aligned with Gherardi's discussion of how practices change and persist (2012) and with Fuller et al's argument (2005) that the peripheral participation model of learning through practice suggests inaccurately that only expert practitioners innovate.

The concept of 'recontextualisation', through which, Guile (2010, 2014) argues, practitioners adapt the expertise and knowledge they bring from previous experience to the requirements of the workplace, as well as shaping and recreating both the workplace (Price et al 2009, Ellström 2010) and their practice (Edwards 2010, Guile 2010, Littlejohn et al 2016) , also clearly implies, if not in every case innovation, then 'innovativeness' – the capacity for innovation. In Guile's view, recontextualisation requires: (a) 'purpose' – it *involves decision-making* by practitioners; (b) a normative context within which both 'conceptual and empirical decisions are judged', ie the decisions taken by the practitioners *can be recognised as making sense within the specific context*; and (c) the recognition that professional reasoning is an integral element of active practice: ie, it 'presupposes inferring what follows from different types of concepts or actions and *responding* accordingly in specific situations' (Guile 2014, p81). Engeström adds to this account a historical dimension:

'*Besides accumulation and incremental change, there are crises, upheavals, and qualitative transformation….an activity system always contains sediments of earlier historical modes, as well as buds or shoots of its possible future. These sediments and buds….are found in the different components of the activity system, including the physical tools and mental models of the subjects.'* (Engeström 1993, p68)

From this perspective, the relevant knowledge used by practitioners in making decisions is seen firstly as likely to be tacit or embodied, as well as or rather than, explicit and propositional; secondly as a matter of inference (Brandom 2000) and judgement – ie, *phronesis* as well as *episteme* or *techne* (Aristotle 330BCE, 2004 ed, Dunne 1993); and thirdly as inherently provisional, in the sense that it aims to be good enough for practical purposes, rather than absolutely correct or true for all time and contexts, including recognition and acceptance of the possibility of further improvement and development in future iterations of practice (Edwards 2010). These three key aspects of 'recontextualisation' open up a space of possibility within practice in which innovation can be accounted for and potentially observed.

In this study I use the term 'entanglement' to denote the problematic nature of standard paradigm conceptions, which dissect practice into, as it were, component elements (knowledge, expertise, skill, organisational environment, agency, culture, etc). My use of this term echoes Pickering's metaphor of 'the mangle of practice' in his discussion of the activity of professional scientists (1995):

'*Human and material agency are reciprocally and emergently intertwined…. Their contours emerge in the temporality of practice and are definitional of and sustain one another. Existing culture constitutes the surface of emergence for the intentional structure of scientific practice, and such practice consists in the reciprocal tuning of human and material*

agency…. The upshot of this process is, on occasion, the reconfiguration and extension of scientific culture….the contours of material and social agency are mangled in practice, meaning emergently transformed and delineated in the dialectic of resistance and accommodation.' (Pickering 1995, p21-23)

My aim, like Pickering's, is to emphasise the dynamic nature of practice, that it is constituted and continually re-constituted from seamless interactions between specific material conditions and the intentions of human and mechanical agents. Pickering admits that his metaphor is not perfect:

'*a real mangle leaves the list of clothing unchanged – 'shirts in, shirts out' which is too conservative an image for the constructive aspect of scientific practice. 'Mangling' also carries connotations of mutilation and dismemberment….which carry one directly away from this constructive aspect*.' (Pickering 1995, p 27)

It is important to note that the term 'entanglement' as I use it refers to my generic conception of practice in the round, and embodies my argument that standard paradigm approaches distort practice as it actually is by differentially highlighting and often prioritising so-called 'components' of practice such as those listed above. In this my conception, like Pickering's, can be seen to be distinct from Edwards's (2010) notion of 'intersecting practices', which she uses to focus on the spaces where different practices overlap, (ie at a higher level of analysis): however, I draw on Edwards's analysis later in my discussion of boundary crossing and boundary artefacts.

2.3.3 Workplaces as environments for learning, innovation and the evolution of practice

A key feature of the emergent paradigm is that it recognises the workplace as a significant site for learning. A practice-focussed perspective, moreover, needs to take account of the

workplace as a simultaneously physical, cultural and social environment or setting for practice, and further, that this environment is continuously being changed and recreated, both contingently and purposefully, through the actions both of nature (for example the deterioration of buildings and equipment over time, or the ageing of employees), and of human beings, whose activities may affect it directly (for example, by their work within it), or indirectly (through their influence on the physical, cultural and/or socio-political context in which the workplace operates).

Felstead and his colleagues (2009) provide a comprehensive framework for accounting for the workplace as an environment for learning, which synthesises and integrates the activities of working and learning. The key concept utilised by Felstead and his colleagues is that of 'Productive Systems', a concept developed by economists as a response to what they saw as the limitations of neo-classical economic theory, which as in the standard paradigm of learning, is seen as having systematically underplayed the importance of social, cultural and political factors in its models and analyses. Felstead and his colleagues argue that it provides the comprehensive and synthetic framework needed to help them interrogate and make sense of the particular workplaces they were looking at:

> '*Productive systems comprise the totality of social relationships entailed in processes of commodity production….it traces the overall configuration of social relationships within economic systems, stretching from individuals and small work groups through to global financial and political systems'* (Felstead et al 2009, p18).

In particular, the productive systems framework affords researchers a way of understanding how power works within and through the interconnected networks and hierarchies of which individual workplaces are parts. It has two axes: one vertical, which frames the 'structures of production' (Felstead et al 2009), with International Governance at the top, and which moves down through

national governments, sector regulatory bodies, senior management of corporations, to individual local workplaces at the bottom. It also has a horizontal axis, the 'interconnections of transformation' referred to formally as the 'stages of production (ibid), from the sourcing of raw materials through manufacture, production, distribution and sales, to consumption of the finished product (Felstead et al 2009, pp19-21). Their argument is that it is the way these vertical and horizontal structures and stages of production 'articulate' that specifies and locates each situation within a conceptual framework that allows this specificity to be described. The 'Productive Systems' approach constitutes a methodological framework that aims to ensure that analyses of workplaces and workplace learning are comprehensive rather than partial.

Felstead and his colleagues argue that the 'productive systems' model is useful for understanding workplace activity in particular in relation to power and control, and to taking account of external influences working on the workplace environment through partnerships and commercial relationships. They point out that the vertical scale ('structures of production') is concerned with the interrelationships of micro-, meso- and macro-levels of the system, and that, although in principle macro-level structures are likely to have more scope to influence activity at lower levels, there are degrees of autonomy at all points in the system, and these factors are subject to variation at all times:

> *'The extent of the relative autonomy of nested regulatory networks in any particular productive system is an empirical question to be investigated in each case. For example, a team of workers may be subject to supervision, monitoring and control from managers employed in the same workplace, while retaining some degree of discretion or resistance. The autonomy of workplace managers may, in turn, be curtailed by the requirements of regional or senior management. The operations of the organisation as a whole may be*

regulated by still 'higher level' sources of control, such as legal statutes, government policies, accreditation agencies, shareholder meetings, auditor reports, banking procedures, and so on.' (Felstead et al 2009, p20)

A key theoretical concept made use of by Felstead et al (2009) in relation to work organisation is 'discretion', referring to 'the degree of autonomy….exercised by workers in the labour processes in which they are engaged' (Felstead et al 2009). It has three dimensions: control over the aims and objectives of the work process, control over the way objectives are attained and tasks executed, and finally the extent to which workers are involved in the monitoring of the outcomes of work processes. The concept of discretion implies both uncertainty, and crucially, trust (Fox 1974, O'Neill 2002) as key elements of work processes: 'Trust bridges the gap between the known and the unknown, the predictable and the unpredictable. Where everything is certain, trust is irrelevant' (Felstead et al 2009, pp24-25). The concept of trust bespeaks the tacit aspects of work organisation, referring implicitly both to consensual but informal practices and processes, but also to what Brown and Duguid (1991) refer to as 'non-canonical' or unofficial elements of workplace practice.

The linked ideas of trust, discretion and autonomy also point to the concept and practice of leadership, a subject much debated in the literature on organisational development: Morgan, for example, in discussing the metaphor of organisations as brains, suggests that:

'*Leadership needs to be diffused rather than centralised, even though goals, objectives and targets may be helpful management tools, they must be used in a way that avoids the pathologies of single-loop learning; goal seeking must accompanied by an awareness of the 'limits' needed to avoid noxious outcomes; and hierarchy, design, and strategic development*

must be approached and understood as self-organising, emergent phenomena.' (Morgan 1997, p117).

Another theorist working within the emergent paradigm, Ulrich Beck, argues that in the new context of 'Risk Society' (Beck 1992), leadership needs to be distributed within organisations and society, and that its function is to exemplify the personal characteristics required of individuals and embody those required of organisations, and in this to represent values and objectives that are clear, openly-stated, and worthy of others' respect and commitment (Beck 1992, 1994). It is in this way, Beck argues, that leadership can contribute to the creation of islands (temporal and geographical) of security in a dynamic world of risk and change. The aims of leadership according to Beck coincide strongly with the paradoxical leadership qualities implied by the need for double-loop thinking (Argyris and Schön 1974, 1978) and innovation: he argues that leaders (that is, everyone) must work to 'demonopolise expertise' (Beck 1994 p29). In this conception, leaders (at any level within the organisation) work not to hold on exclusively to power, influence and knowledge, but to distribute them; they aim to lead less by explaining, more by being, by offering visions that gain respect, and values and metaphors that contribute to a continuously renewed process of understanding and commitment (Beck 1992, 1994). Furthermore, the process of gaining respect and commitment for a set of values and objectives, in the context of 'conditions of modernity' (Giddens 1994), constantly needs to be renewed and re-energised. In these conditions, leadership paradoxically means continually reminding people to reconsider their commitments and trust relationships, including their commitment to the organisation they are working for, thus again emphasising the value of reflective practice (Schön 1983) and authenticity in conditions of continuous change (Giddens 1994). From the perspective of the 'productive systems' framework (Felstead et al 2009), leadership of this kind aims continually to flatten the vertical structures of

production, and to ensure chains of dialogue and communication within and beyond organisations are two-way, so as to maintain trust and confidence between practitioners and leaders, and to ensure organisations make the best use of the expertise of all their practitioners.

Felstead et al's (2009) schema for analysis effectively incorporates and augments Fuller and Unwin's influential 'Expansive-Restrictive Continuum' (Fuller and Unwin 2004, 2006). This is an analytical tool for use in comparing different work environments from the perspective of learning. It grew out of research founded within the situated learning tradition, but it takes a critical and developmental stance towards some of this work. In particular, it argues that work in this tradition, in its concern to emphasise the more implicit cultural and anthropological dimensions of workplaces, often tends to undervalue formal aspects of workplace learning. It consists of twenty opposing pairs of organisational characteristics and practices, some institutional, some cultural and others pedagogical, enabling any organisation to be evaluated and positioned on the continuum as a way of comparing it against itself over time, and/or with other organisations. Using it may well suggest practical ways in which the organisation can be improved as a learning environment, and thus it has a powerfully practical function, as well as being a tool for theoretical analysis. Its twenty criteria reflect Fuller and Unwin's three major propositions: firstly that learning at work is a function of participation in workplace processes and activities, and is associated with opportunities for practitioners to gain experience of 'going beyond' familiar roles, tasks, domains, not least by working with specialists from diverse communities of practice. Secondly, it implies that organisations can support learning through various types of formalisation, or what is termed 'reification': through explicit codification of knowledge, procedures and policies, for example, and through supporting employees to gain relevant formal qualifications. It implies thirdly that organisations should explicitly value learning and development of their employees, for example by

making this a formal responsibility of line-managers and section heads. The agency of individual workplace practitioners in being open to or seeking opportunities for learning, in what Billett (2001b) refers to as 'co-participation', is relatively muted in this model (Bishop 2017), though it is clearly recognised. The motivation of individual practitioners, whether employees or otherwise, to engage in learning activities in the workplace is a central focus for other analytical approaches (see for example Billett 2001b, 2004), whereas the Expansive-Restrictive Continuum primarily focusses on the contingent cultural and organisational characteristics of the workplace as an environment within which practitioners may learn. In discussing this interaction between practitioner agency and the affordances of the workplace environment in small and large engineering firms, Bishop calls for 'narrowing rather than maintaining the divide between more structured accounts of skill formation and those that focus on individual agency' (2017, p83). I suggest that these aspects of the phenomenon need to be understood as fundamentally 'entangled'.

This discussion suggests that using the Expansive-Restrictive Continuum as an analytical tool is likely to be effective in revealing the ways in which the organisations in the study make use of learning as part of both production and innovation, but that it may also illustrate wider issues and throw new light on to theoretical debates on learning through practice, on optimal organisational structures and learning, and on optimising innovation.

Both the 'Productive systems' framework (Felstead et al 2009) and the Expansive-Restrictive Continuum (Fuller and Unwin 2004, 2006) have been developed through research carried out mostly in what might be described as 'bricks and mortar' organisations, in the sense that the workplaces exist physically, practitioners are employees of the organisation, and management, even if it makes use of technological tools, is carried out for the most part through human interactions. However, we have seen a recent rapid increase in what Srnicek (2017) describes as

'platform capitalist' organisations, in which practitioners are likely to be self-employed entrepreneurs providing services to clients by renting the use of digital platforms (see also Margaryan 2016, Eurofound 2018) These platforms are owned by companies that thus completely avoid the costs, risks and responsibilities associated with traditional employment, and whose primary business objective is not necessarily the provision of services but the collection, analysis and marketing of client data. This relatively recent phenomenon raises important theoretical and practical questions about, for example, learning and/or innovation through practice, practitioner autonomy, team-working, and leadership. Do these 'workplaces', in which practice is regulated increasingly by technological systems and algorithms, require completely new conceptual frameworks for understanding the practice that takes place within them, or do existing frameworks merely need to be extended or elaborated? There is not sufficient space in this thesis to do more than reference this important area for future theoretical and practical work, especially as both the case study organisations used in this study are of the 'bricks and mortar' type. This limitation of the findings of the present study is explicitly acknowledged in chapter 6.

This section of the chapter has discussed the literature on the workplace as a site for learning. It has focused in particular on the influences on and the contributions made to practice by the informal aspects of workplaces, for which I have proposed the term 'tacit pedagogy'. It has then surveyed research on workplaces as environments for practice, looking in particular the 'Productive Systems' framework proposed by Felstead et al (2009). The next section surveys the literature linking knowledge, learning and innovation in the context of practice.

2.4 New knowledge, 'Innovativeness', and practice

2.4.1 Introduction

For researchers working within the emergent paradigm, innovation is a key concept for conceptualising and theorising about workplace practice and learning. This section briefly discusses literature on organisation-driven, and then on employee-driven, innovation. Most of the literature of both types reifies the concept of innovation, usually as either a new product or a specific development of the work process (see for example Francis and Bessant (2005) who identify four distinct areas for innovation: Product, Process, Paradigm and Positioning). Such innovations are usually seen as the result of an explicit, technocratic and top-down organisational strategy, often involving the bolting-on of a specialist innovation unit or department, through which innovations are seen as additions to the regular products or as incremental adaptations of the regular production process. More rarely in the literature, innovation is conceived as being, as far as possible, distributed holistically throughout the organisation as 'innovativeness', and as potentially transformative. Both types of research have tended to reference learning in connection with innovation, at either the organisational or employee level, and in so doing have certainly highlighted the workplace as a site for learning, but as Ellström (2010), Jensen et al (2007) point out, many commentators have failed to problematize the concept of learning itself, and have focussed mostly on formal modes, in the manner of the standard paradigm.

An exception to this, apart from these two, is the key idea about the 'production of new knowledge' advanced by Gibbons et al (1994), which posits a transition from traditional notions of knowledge production (which they call Mode 1), characterised by stable institutional structures; a division of labour between those institutions, teams and individuals which innovate, and those which do not; hierarchical, planned approaches to innovation; innovative activity seen as taking place within formal disciplines and specialisms; and evaluated against narrow and stable quality

control criteria. Mode 1 knowledge production arrangements, Gibbons et al suggest, are increasingly accompanied by Mode 2:

> *'It is transdisciplinary rather than mono- or multi-disciplinary. It is carried out in non-hierarchical, heterogeneously organised forms which are essentially transient. It is not being institutionalised primarily within university structures. Mode 2 involves the close interaction of many actors throughout the process of knowledge production and this means that knowledge production is becoming more socially accountable….(and) is becoming more reflexive….it is in the nature of Mode 2 that it manifests itself in a variety of forms.*' (Gibbons et al 1994, pp vi-viii)

Another exception to the standard paradigm orientation in relation to learning and innovation is Bessen (2015), who highlights the role of learning as an indispensable element of the implementation, as well as in the conception, of innovative developments. Learning is difficult in the early stages of implementation of any new technology or work process development, he argues, because the innovation itself, and methods for operationalising it, are immature: practical aspects of it are still experimental, and the knowledge involved is 'sticky' (Brown and Duguid 2001) - that is, largely tacit, still embedded in practice, and highly localised. It lacks at this stage the level of articulation and standardisation needed to facilitate local learning, let alone for wider distribution. Bessen conceives learning as a process entangled with practice, and dependent on the degree of its familiarity (Bessen 2015).

This section concludes by reviewing holistic and practice-based perspectives on innovation, aligned with dynamic and expansive conceptions of learning, expertise and organisational development. Incremental, technocratic and specialist approaches to innovation are located within this overall conception as special cases.

2.4.2 Organisation-driven innovation

The standard paradigm is unable to provide a satisfactory account of change in workplace organisation and practice, in relation not only to radical and/or disruptive changes, but also to incremental developments in terms of workplace knowledge, methods, materials and practices (Beckett and Hager 2002). In fact, as has been mentioned earlier, there has been a widespread failure to recognise the mismatch between many models of organisational learning and the substantial body of empirical evidence on how organisations actually function and develop, especially during times of change (Ellström 2010). Furthermore, rapid change has increasingly become the norm in the organisational, intellectual and economic environment within which practice takes place (see for example, Morgan 1997).

This issue began to be addressed by Argyris and Schön (1974, 1978) and Argyris (1977), who introduced the idea of 'double-loop thinking', which drew attention to important aspects of organisational planning largely ignored by technocratic and static models of business, not least that if the environment changes, organisations need formal processes for changing themselves from within. This led them to argue for the importance of organisational cultures that are open to change, and which allow or even encourage challenging proposals, perhaps from unorthodox locations or staff within the organisation. Organisations without the capacity for double-loop thinking, they suggested, tend to develop 'defensive routines' in which they create increasingly strong resistance to any change in norms, behaviours and assumptions, and therefore, to potentially significant innovation. The implication of Argyris and Schön's work is that organisations, particularly in times of environmental change, need to be strategic about learning, at the levels of both the organisation and of teams and individuals. The organisational cultures likely to thrive best

in times of change, they argued, were likely to be more collegiate, less hierarchical, and which created 'affordances' (Billet 2001a) for critical and creative thinking throughout the organisation. Argyris's ideas also led quite naturally to the notion that key aspects of the way an organisation works are tacit, residing for better or worse in the actions of individuals, both conscious and unconscious, rather than being determined by formal procedures and rules:

> '*It is important to distinguish between enabling organizational learning and producing it. Enabling organizational learning includes group, inter-group, and organizational features such as policies, practices, rules, and organizational memory. Producing organizational learning is done by individuals taking action.*' (Argyris quoted in Crossan 2003).

In 1982, Nelson and Winter, from the perspective of organisational economics, produced a powerful critique of dominant modes of abstract economic modelling and analysis, arguing that they too, like the standard paradigm of learning, are unable to provide satisfactory accounts for organisational change, development and innovation, and that therefore the findings and recommendations of research based on these modes of analysis was likely to be misleading. They argued that these approaches were founded on idealistic, positivistic models of organisations, on the patently false assumption that organisations and individuals always behave 'rationally' and in their own interests, and on research methods that routinely ignored organisational cultures, norms and practices that couldn't be fitted into their abstract models or were hard to measure (a point reiterated much later by Jensen et al (2007) in relation to the 'DUI' mode of knowledge and innovation). Nelson and Winter proposed instead an 'evolutionary theory of economic change', aiming to provide a more grounded and realistic account of organisations, and in particular of change and innovation (1982). Their work provides a useful and supportive theoretical context for emergent paradigm research into workplace learning and innovation (and for this study), from a

purely economics perspective. At the same time literature on organisational development was recognising the importance and challenge of innovation for organisations, but it was typically reified and located as an organisational function in specialist R&D units: Galbraith (1982) argues that 'differentiation' of the innovating function from the operating function within and between organisations is necessary, because:

> '*Innovative ideas are destructive; they destroy investments in capital equipment and people's careers. The management of ideas is a political process.*' (Galbraith 1982, p11).

This type of analysis sees the generating and fostering of innovation as a specific management function, involving clear strategic choices, some of which support innovation and some that will not. Strategic decision-making for the organisation is seen as somehow above and overlooking its culture, in a manner typical of a technocratic, 'command and control' view of organisational management, that is, of the standard paradigm.

In the late 1980s John Seely Brown and his colleagues began linking the literature on organisational learning directly with workplace learning literature beginning to be produced within the emergent paradigm (for example Brown et al 1989, Brown and Duguid 1991, 2001). The work of Brown and his colleagues has more than any other body of theory succeeded in synthesising thinking about organisational cultures and development, situated and social practice approaches to workplace learning, learning through practice, and the role of learning in innovation. Later still, these ideas were incorporated into the concept of 'Learning Organisations' (for example Senge 1990, Morgan 1997), which also aimed to integrate organisational development with the theory of situated learning.

Weick and Westley (1996) argue that what is needed is to connect the theoretical with the experiential (ie to pay attention to more anthropological data about work processes), and to distinguish carefully between individual and organisational learning. Their view is that the solution to the historic mismatch between theory and evidence is '*to focus on cultural aspects of organisations which can perhaps provide us with images at once social and experiential with which we can explore and ground a discussion of organisational learning'* (p440). This is precisely the approach embodied in the emergent paradigm. It is a view, as we have seen, that insists on the need to pay attention to all aspects of the situation; in order to do this it remains true that we will need to treat these aspects in our mental models and in the language we use as if they are discrete, in order to think about and name them, so as to be able to articulate and share our thinking. However, as Bourdieu (1997) reminds us, making use of discrete concepts in order to examine and evaluate them does not imply that the real work processes they relate to are themselves separable into these elements, or that in so doing our account of those processes is not in fact distorted. The iterative process of moving backwards and forwards between consideration or apprehension of workplace processes holistically (as it were without analysis), and using the techniques associated with rationality (naming of parts, comparison and evaluation of discrete elements of the process, construction of mental models, de-construction, codification, etc) so that fundamentally tacit processes can be apprehended at all, is one that all researchers in the emergent paradigm aim to engage in. What is argued here is that this back and forth process is in fact an account of all human practice: experience is always distorted and fragmented by 'rational' thought, because though we are able to distinguish oppositions and paired distinctions, and though these help us, not just to engage with experience, but precisely to shape it and change it, experience is never reflected truly by these distinctions and mental bifurcations. Rather, the discrete elements of experience we perceive rationally which enable us to think about, share our thoughts, and propose changes to our

actions, are in reality indissolubly entangled. This issue is elaborated further in Edwards's (2010) discussion of 'intersecting practices', Akkerman and Bakker's unpacking of the notions of 'boundary crossing' and 'boundary objects' (2011), Gherardi's idea of innovation as a constant refinement of practice (2012), and Guile's concept of 'recontextualisation' (2010, 2014): these concepts will be explored in more detail later in this chapter.

2.4.3 Employee-driven innovation

Among the earliest researchers explicitly to connect the tacit expertise and knowledge of practitioners to innovation were Nonaka and Takeuchi (1995) and Nonaka (1996):

> '*Creating new knowledge is not simply a matter of 'processing' objective information. Rather, it depends on tapping the tacit and often highly subjective insights, intuitions, and hunches of the individual employees and making these insights available for testing and use by the company as a whole.*' (Nonaka 1996, p19).

Nonaka sees innovation as a process through which new ideas can emerge from employees' own thinking about their own practice (and which is dependent therefore on the employees' feelings and motivation about their work) and which involves tacit knowledge becoming explicit, enabling it to be shared and evaluated more widely.

> '*The key to the process is personal commitment, the employees' sense of identity with the enterprise and its mission. Mobilising that commitment and embodying tacit knowledge in actual technologies and products requires managers who are as comfortable with images and symbols….as they are with hard numbers measuring market share, productivity, or ROI'….In this respect, the knowledge-creating company is as much about ideals as it is about ideas.'* (Nonaka 1996 p19).

Nonaka's view foregrounds the importance for generating and sustaining innovative change of the values, the day to day social culture, and the work processes operating within the organisation, so that employees have space to think about their work in ways which allow new ideas to emerge and be evaluated, and are enabled, encouraged, and critically, motivated to share their thinking, first with fellow employees, and then at higher levels of the organisation. If these condition are present, Nonaka discerns what he calls a 'spiral' of continually developing knowledge, characterised by four different interactions between tacit and explicit knowledge: Tacit to tacit, in which for example an apprentice is 'socialised' into craft skills and activities; from explicit to explicit, in which existing codified and explicit knowledge (for example formal measurements of production) are represented in a new format; from tacit to explicit, in which practitioners find ways to articulate and share their tacit expertise (Nonaka argues that the use of metaphors is an essential aspect of this articulation); and from explicit to tacit, as when practitioners introduce a new technique as part of their work, which in time beds down, becomes automatic, and so contributes to changing the tacit expertise of the practitioners. Eraut (2004) argues that tacit knowledge is harder to capture and then articulate than Nonaka's analysis implies:

> '*most of the knowledge (he) describes was already explicit; it was personal knowledge that had not previously been considered relevant or shared with others.*' (Eraut 2004, p263).

This difference of perception illustrates how tacit and explicit knowledge are both present and entangled in all situations of practice.

Høyrup (2010) aims to operationalise the importance of the tacit expertise of practitioners in organisational strategy by identifying what he calls 'employee-driven' innovation:

> '*employee-driven innovation belongs to the broader categories of non-technical, non-R&D innovations and high-involvement innovation. The focus is on innovative practices, contributed by any employee (outside the boundaries of his/her primary job responsibilities), at all levels of the organization. Innovation is driven by employees' resources: ideas, creativity, competence and problem-solving abilities. These innovative activities are embedded in employees' daily work activities – often in working teams – on the basis of their experience and on-the-job learning.*' (Høyrup 2010, p149)

Høyrup's (2010) conception of employee-driven innovation argues, on both humanistic and strategic grounds, that organisations should pay more attention to the potential of their employees to contribute to the process of organisational development and prosperity, and develop organisational strategies to realise this potential. Price et al (2012)'s account gives a more active role to practitioners in this process: they recognise a key mechanism for employee-driven innovation is the way practitioners continually tinker with and make adjustments to the circumstances and conditions of their work (or 'tune' them, in Pickering's (1995) terms), aiming to make their work more comfortable, safe, and/or productive, a process described as 'remaking jobs' (Price et al 2009). This reminds us that the factors driving innovation in any specific particular situation cannot be straightforwardly categorised as either organisation- or employee-driven: this is another theoretical distinction between perspectives which are in practice entangled.

2.4.4 Practice-based innovation

Research on practice and practice-based innovation and learning from within the emergent paradigm has aimed to identify, research and examine characteristics of practice in general through which its holistic, collaborative and fundamentally tacit nature is acknowledged. Paavola et al

(2004) discuss three conceptual frameworks for understanding the relationship between workplace learning and innovation, all firmly within the emergent paradigm: Nonaka and Takeuchi (1995), and Bereiter (2002) and Engeström (1999). Paavola and his colleagues argue that though these frameworks differ in their treatment of the concept of knowledge-creation (emphasising it respectively as the conversion of tacit into explicit knowledge, as the remediation of knowledge through 'expansive' collaborative learning in a 'Change Laboratory', and as the development of conceptual artefacts which support improved workplace production), they are all significant. Paavola et al argue that Sfard's two metaphors for learning referred to earlier in this chapter (1998) are inadequate, proposing a third: learning as knowledge-creation, in which:

> '*learning is understood as a collaborative effort directed towards developing some mediated artefacts, broadly defined as including knowledge, ideas, practices, and material or conceptual artefacts*.' (Paavola et al 2004, p570)

All these theoretical frameworks have aimed to develop tools for conceptualising, discussing and researching learning, practice and innovation which aim to avoid distorting and reducing it by arbitrarily imposing upon it mechanistic concepts and/or models designed for other purposes. These tools include the notions of (a) 'boundary crossing' and 'boundary artefacts' (see for example Bereiter 2002, Carlile 2004, Engeström 2004 & 2008, Hoyles et al 2010, Akkerman and Bakker 2011), which help account for collaborative working between specialists in different domains (see especially Edwards 2010), practitioners with different levels of experience, or from different organisations); (b) 'recontextualisation' (Guile 2014), which conceives practice as a re-shaping process which always involves learning and potential innovation and (c) Gherardi's wholly 'practice-based' conception of innovation:

'*resulting from both deliberate and unforeseen or improvised processes according to a 'fuzzy' logic, following numerous routes, generating a multitude of ideas and establishing numerous connections-in-action during a constantly-changing process. A practice-based approach therefore furnishes a specific point of view on innovation and change because it shows how the subjective relationship between practitioners and the object of practice comprises a distinctive dynamic of innovation based on the constant refinement of that practice. This process of innovation by refinement may be spontaneous and emerge from the community of practitioners, but it may also be sustained organisationally and institutionalised as a learning practice.*' (Gherardi 2012, p228)

The concepts of 'boundary crossing' (Akkerman and Bakker 2011) and 'recontextualisation' (Guile 2014) are closely related. They move beyond the concept of 'transfer' used extensively by earlier, more individualistic accounts of workplace learning: each has a dialectical, or, in Bakhtin's terms 'dialogical' character (1981, cited in Akkerman and Bakker 2011), and suggest that while working across boundaries is complex and problematic (Carlile 2004), individuals, practitioner teams and contexts are changed, developed, and possibly transformed, as a result. Akkerman and Bakker identify four separate mechanisms through which boundary crossing can generate learning and innovation: 'identification', in which practices from one context are articulated so that they can be legitimised and compared with those of another; 'co-ordination', in which means are found to align practices from different contexts so that they can be mutually compatible, though without necessarily transforming them; 'reflection', through which one context's perspectives are made explicit so that they can be evaluated, and through which new perspectives can be articulated; and finally, 'transformation', in which new practices are generated, through processes which may involve confrontation and disruption, and may include the identification of 'a shared problem

space', hybridisation (a new form combining both earlier practices), and/or crystallisation or reification of the transformed practice (Akkerman and Bakker 2011). This positive conception of 'boundary crossing' includes the 'non-canonical' practices noticed by Brown and Duguid (1991), in which practice can sometimes be innovatively developed by 'breaking the rules': where legitimate goals are achieved through 'work-arounds' which by-pass formal regulations. Edwards's discussion of 'intersecting practices' (2010) in relation to multidisciplinary work in care contexts also suggests explicitly that the challenge of understanding and communicating between professional practitioners across disciplinary boundaries creates the conditions for both learning and innovation.

'Boundary artefacts' (Engeström 2004 & 2008, Hoyles et al 2010, Akkerman and Bakker 2011) in this account, are 'objects' of practice, brought into being through the activities of practitioners working across boundaries, and which in collaborative and interdisciplinary contexts, are at the same time the occasion, the framework and the means for practitioner learning and for innovation, through problematic collaborative processes which Toulmin (1999) describes as developing 'shared procedures' and Engeström as 'negotiated knotworking' (Engeström 2004 p152). The interactive medium within which this collaborative process takes place is made up of provisional 'representations' (Orr 1996, Suchman 1987) of practice, of various degrees of formality, which are shared and for the most part constitute 'work in progress'.

Orr's (1996) ethnographic account of the work of photocopier technicians, a classic example of a study of practice 'in the wild' (Hutchins 1995), makes use of the anthropological concept of bricolage (Levi-Strauss 1966), Schön's (1983) notion of reflective practice, and Suchman's (1987) account of situated practice:

'all [these concepts] centre on the interactive construction of an understanding and a basis for action in the context of the problematic situation. Such constructions are part of

learning, additions to the bricoleur's set, and will be revisited in retrospection or when attempting to analyse new problems'. (Orr 1996, p12)

This must be one of the earliest pieces of work which explicitly brings together practice, learning and innovation in a phenomenologically authentic and seamless account of workplace activity.

Guile's (2014) concept of 'recontextualisation' also aims to provide a practice-based and constructive account of the processes through which knowledge and practices are extended and renewed in new contexts. For its full potential to be realised, according to Guile, it requires: (a) 'purpose' – it involves decision-making by practitioners; (b) a normative context within which both 'conceptual and empirical decisions are judged', ie the decisions taken by the practitioners can be recognised as making sense within the specific context; and (c) the recognition that professional reasoning 'presupposes inferring what follows from different types of concepts or actions and responding accordingly in specific situations' (Guile 2014, p81). From this perspective, as we noted earlier, the relevant knowledge used by practitioners in making decisions is seen firstly as tacit or embodied, as well as explicit and propositional; secondly as inferential (Brandom 2000) and judgemental, and thirdly as inherently provisional, in the sense that it aims to be good enough for practical purposes, rather than absolutely correct or true for all time and contexts. Guile (2010, 2014) argues that these key aspects of 'recontextualisation' open up a space of possibility within practice in which innovation can be accounted for and potentially observed. Guile uses Brandom's (2000) concept of inferential knowledge to argue that 'human judgement is the primary unit of knowledge' (Guile 2014, p 82), and he also directly links this provisionality to capacity building and professional development, because to demonstrate the reasonableness of their inferences and judgements, practitioners continually have to develop the capacity to articulate and justify their decisions to their colleagues, through participation in the social practice of giving and asking for

reasons (Guile 2010, pp135-139). In this conception, therefore, professional development is constituted by this kind of communicative participation, and is integrally linked both to practice itself and to the space within practice that allows for innovation.

In contexts where these characteristics of practice are being purposefully or even unconsciously operationalised, this will be indicated by observable individual behaviours, informal collective routines and formal organisational policies and processes, including for example that (a) teams have high levels of discretion to determine their own work-processes within a broad organisational-level strategic framework (Felstead et al 2009); (b) team work schedules make time available for reflection, sharing knowledge, collective planning, and continuous review (Brown and Duguid 2001, Engeström 2008); (c) informal interaction between team members and critically, other practitioners both in and outside the immediate organisation, is enabled and encouraged, within an overall culture which sees learning as a social rather than technocratic process, and as informal as well as formal (Lave and Wenger 1991, Nardi 1997, Brown and Duguid 2001), Beckett and Hager 2002); (d) organisational processes are structured as opportunities for practitioner development: quality assurance and the development of institutional strategy involve staff as expert consultants, peer reviewers, and as environment scanners – this feature is more likely to be found working effectively in smaller organisations or in those with flatter hierarchical structures (Burns and Stalker 1961, Morgan 1997); (e) there are opportunities for all staff to take up different roles and specialisms from time to time, because they are all seen as having developmental capacity and as potential innovators; (f) there is clear emphasis at organisational and team level on formal and informal 'writing up', reflecting the continuous attempt to capture tacit knowledge so that it can be shared and evaluated, as potential material both for learning and innovation (Nonaka 1996, Knorr Cetina 1999, Jensen et al 2007); (g) there is a stable and explicit organisational

commitment to high standards of practice and ethics, and to the production of social and public, not just economic value; and (h) there are formal opportunities for staff to undertake 'blue-sky' research, operational mistakes are seen as opportunities for learning, and risk is valued and used constructively rather than avoided.

Significantly, the constellation of ideas around both 'boundary artefacts' and 'recontextualisation' apply just as well to practice contexts which are not workplaces, and many of the organisational features enumerated in the last paragraph will be observable in any context of practice whether or not it is seen as 'work'. Gherardi's broad conception (2009, 2012) of 'practice-based innovation' reminds us that practice and innovation are features of human activity in general. Practitioners and innovators may be enthusiasts, whether or not their practice consists of paid work:

> '*When work practices are viewed from the standpoint of the practitioners, ie 'from within', what is of interest to the researcher is the intellectual, passionate, ethical and aesthetic attachment that ties subjects to objects, technologies, the places of practices, and other practitioners….[asking] how practitioners are able to put their passions into practice and how practising their passions may contribute to the development of a field of practices and to the elaboration of an aesthetics of practice leading to innovation and/or persistence of practice'* (Gherardi 2012, p224)

This conception also helps account for the significance of intrinsic motivation in supporting productivity, high quality work and innovation among employed practitioners.

These observable features of practice situations align well with, and in some ways also develop, Burns and Stalker's list of features of 'organic' organisations (1961), Morgan's (1997) list of

the features of 'organisations as brains' and also the features of 'expansive' organisations (Fuller and Unwin 2004, 2006).

2.5 Research questions

In this section I synthesise the discussions in the earlier parts of this chapter, and show how this synthesis has supported the design of the key research questions for the study. The methodological strategy and design for this study is presented, located in the methodological literature, and justified in the next chapter. This will include the methodological approach adopted to data analysis, and in particular the selection and design of analytical themes and codes, which were also based on this chapter's literature review.

The key themes emerging from the discussions in this chapter that are used to inform and structure this study are as follows: (a) the study aims to conform to the emergent paradigm of learning, and to avoid as far as possible positivistic assumptions and conceptions typical of the standard paradigm; and (b) it aims to throw light on the 'tacit pedagogy' of workplaces (which also encompasses explicit procedures, rules and policies within particular workplaces). (c) It aims not to structure its investigation around the conceptual separation of paired categories such as 'formal' and 'informal', 'tacit' and 'explicit', 'theory' and 'practice', etc. (d) It treats learning and innovation as more or less co-terminous, and (e) it makes use of the 'productive systems' analytical approach of Felstead et al (2009) as a broad analytical and explicatory framework which does not conflict with any of the other key points from this literature review.

In the light of this review of relevant literature, the following main research question and sub-questions were adopted for this study:

- How do practitioners in high-performing organisations make use of informal modes of learning and team-working to support innovation?

Three subsidiary questions were also chosen:

- What informal features of organisational culture, work processes and strategic orientation support innovation in two high performing organisations?
- How do these features interrelate with formal features of these organisations?
- How are learning, innovation and practice interrelated conceptually?

These questions are designed to be specific and sharply focussed, so as to optimise the likelihood of the investigation succeeding in providing answers to them. The key themes enumerated above also inform the study's methodological strategy, presented and discussed in the next chapter, which are designed to use these questions to produce data on specific practices engaged in by teams in these two organisations, and on the similarities and differences between teams' practices in the two organisations. It also aims to collect relevant data on the two organisational environments for the teams' practices, including in particular those features of the environment which constitute the 'tacit pedagogy' of each workplace, and the ways in which these different features interrelate. Finally the study aims to use these data to provide support for further development of the conceptual frameworks for workplace learning and innovation discussed in this literature review.

Chapter 3 Research design and Methodology

3.1 Methodology: the evolution of my approach throughout the Ed D

The complexity of the theoretical relationships between learning, practice and innovation within dynamic knowledge domains and social contexts implies that methodological questions need always to be to the fore. Methodical approaches are associated with particular theoretical orientations, conceptions and models. In order to be aligned appropriately within studies of practice, research methods need in a real sense to be reconceptualised for each study. This chapter outlines and justifies the methodological approach taken in this study, in relation to the evolution of my methodological thinking from the beginning of my Ed D programme, design and sample selection, data collection and data analysis. These four aspects of the study are dealt with in turn.

The theme of this thesis, as I showed in Chapter 1, arose directly from my previous work in the Ed D; and it has followed from this that the methodology I have used in this thesis has in effect been a refinement of the approach I developed in the earlier stages of the Ed D, that is, in my Methods of Enquiry (MOE) project, and the larger-scale Institution-Focussed Study (IFS) (Derrick 2012a, 2012b, 2014). As I have shown, these earlier phases of my Ed D work constitute evolutionary thematic developments towards the focus of my thesis, and this is also true of the methodological approach I have adopted in undertaking the research presented and discussed in this dissertation.

The earlier pieces of work were both qualitative case studies (Thomas 2011) in which data collection was carried out through extended semi-structured interviews. In the earliest, MOE phase of my Ed D I argued that this overall approach was appropriate because my enquiry was directly focussed on different practitioners' own perceptions and reflections about the most significant

ways in which they had acquired their expertise. A case study approach was appropriate here as while data on the perceptions of a small number of subjects cannot easily be generalised, they can provide both 'thick descriptions' (Geertz 1973) of lived experience (which can be compared with similar studies carried out previously) and 'telling cases' (Mitchell 1984) which help us 'get close to reality' and avoid missing significant 'little things' (Flyvbjerg 2001, p132-133), and around which hypotheses and future research can be designed. The only methodological alternative to involving participants directly in this way would be to observe them in their practice at great length, which would not only be time-consuming and expensive, but would in many ways not work – to observe an activity is not necessarily to understand it. In a study aiming to learn about human perceptions and reflections, the research subjects will ideally develop an understanding of and engagement with the rationale and objectives of the enquiry, so that their responses are as relevant, helpful and rich as possible. This approach, then, adopts some characteristics of participatory action research (eg Lewin 1946, Argyris et al 1985, McIntyre 2008). As a professional teacher, this approach appeals to me as it aims for, not just co-operation between the researcher and the research subjects, but also personal engagement between them on the basis of some degree of shared experience, reflections and/or conceptual orientation; this approach also implies that mutual learning is likely to be taking place through the process of developing this shared understanding, while also of course, enabling the collection of data (Lewin 1946, McIntyre 2008).

The ethical issues involved in this participatory approach were informed by the BERA standards (BERA 2018), and include properly informed consent, anonymity, care to minimise any anxiety brought about by exploration of potentially personal histories, and a commitment to share the results of the research to which they had contributed with the participants.

The three extended interviews I carried out for this small-scale study gave me experience in preparing, carrying out, recording and transcribing interviews, and improved my understanding of the practical and conceptual implications, including strengths and limitations, of semi-structured interviews as a mode of data collection (Weiss 1994, Wengraf 2001, Drever 2003, Kvale and Brinkmann 2009, Derrick 2012a).

My original plan for the IFS stage of my Ed D, which I saw at the time as having the potential also to be the focus of my thesis, was to continue and extend these case studies about the acquisition of expertise by individual practitioners. I was expecting, therefore, to continue my research programme with the same qualitative methodological approach, relying on semi-structured interviews and thematic analysis of interview transcripts as my primary methodological tools (Miles and Huberman 1994, Gibbs 2007, Maxwell and Miller 2008). In fact, as already described, I had to adjust the focus of the IFS stage of my research so as to satisfy the requirement to focus on a specific organisation. Having chosen TLZ R&D as this organisation, I identified a key formal structure for learning within the organisation, its induction programme for new employees: the study was then designed to collect practitioners' accounts, reflections and evaluations of this, using interviews and focus group sessions, as a lens on the perspectives and strategy for learning of the organisation as a whole. My IFS became a case study of the ways in which people with different specialist backgrounds can be inducted into an organisation which needs them to work collaboratively and innovatively, but at the same time my respondents were providing data about the development of their expertise, as in the earlier small-scale study. The ethical approach adopted earlier was also used for the IFS: in this case I needed permission from the organisation to interview its employees as well as informed consent from the participants. The same issues of anonymity, care to minimise anxiety and sharing of the results also applied (BERA 2018).

The overall methodological strategy for the present study is still that of a qualitative case study, but this time with a combined and integrated focus on the interrelationship between individual practitioners and the environment within which they work and learn, analysed primarily at the level of teams. Making use of teams within two quite different organisations provides opportunities for comparative analysis. The ethical issues are the same as for the IFS, except that there were two organisations, and the same approach to research ethics was adopted (BERA 2018). The detailed methodological approach to sample selection, data collection and analysis is discussed in the next section. The primary research question adopted was:

- How do practitioners in high-performing organisations make use of informal modes of learning and team-working to support innovation?

Three subsidiary questions were also developed:

- What informal features of organisational culture, work processes and strategic orientation support innovation in these organisations?
- How do these features interrelate with formal features of these organisations?
- How are learning, innovation and practice interrelated conceptually?

This section of the chapter has traced the evolution of the overall methodological approach adopted in this thesis, which has been broadly consistent, but refined since the earliest stages of my Ed D. I now elaborate the overall design of my thesis research study which aims to address the research questions enumerated above.

3.2 This thesis: design and sample selection

For my thesis, as described in Chapter 1, the focus of my enquiry became practice in the round, rather than just individual practitioner agency and expertise on the one hand, or the context of organisational affordances on the other. My original conception was a comparative qualitative study into the activities and perceptions of teams of practitioners in unrelated workplace contexts, quite different in terms of size and fields of activity, and of the domains of expertise of their practitioners. The key aim and methodological challenge was to investigate the contribution made by the informal elements of workplace practice, which I argue can be viewed as the 'tacit pedagogy' of each context to learning, innovation and practice, with the objective of identifying any commonalities, and with the possibility that more general inferences about the organisation and culture of workplaces might be drawn.

Because the study was planned as a qualitative investigation of generic aspects of practice, the selection of possible organisations to approach to participate appeared not to be problematic. The scale of the study and limitations of time suggested that recruiting two such organisations would be appropriate and practicable; and clearly, too, they should be operating in unrelated occupational domains. However, it was recognised that two organisations, however different, cannot be taken to be representative of organisations in general: for example, it is likely that findings in public-sector organisations may differ from those from private, profit-making enterprises. Even more problematically, the increasing prevalence of digital platform employment, in which practice and work processes are increasingly controlled, driven and monitored algorithmically, raises specific issues which are unlikely to be reflected in the same ways in more traditionally-organised workplaces (Margaryan 2016, Srnicek 2017). In this study, therefore, these issues are not addressed, but left for future research.

I also decided that they should ideally be two 'high-performing' organisations, as measured by their reputations within their respective industries, so that if significant practical findings about work processes, management styles, or the organisation of learning were made by the study, these might have increased impact in each relevant field, as they would be associated with organisations recognised as successful. 'Innovative capacity' has been widely used as an indicator of high performing organisations in the organisational development literature on 'high-performance work practices' (see for example The Work Foundation 2003, Tamkin 2004, Timiyo 2014). However, there was no suggestion in this element of the design that the study would be engaging with the academic literature on 'high-performing organisations': that was seen as a potential area for future research. I also hoped that, in the event of any possible difficulties in securing agreement from organisations to participate in research, and the challenge of gaining access to their staff, I hoped that if I was able to explain to prospective sites that I needed their participation on the basis of their reputation and status as successful and 'high-performing', this might encourage them to participate and at the same time build trust and confidence in me.

For the first of these organisations, TLZ R&D suggested itself as an obvious candidate, partly because of my existing knowledge of it from my IFS research, and also because there was the possibility that some of the data collected then might be relevant and useful for the thesis study too. TLZ R&D also had a widely-held reputation as a high-performing organisation, indicated by the role its staff have consistently played in the global broadcasting engineering community and in international collaborative research projects, and by its history of producing significant technical and theoretical advances. For the other site, I decided to try to find a 'high-performing' General Further Education college; after working for many years in the Further Education (FE) sector in London, I hoped that my knowledge of the sector would help me get permission to research such

an organisation relatively easily, support me in establishing co-operative relationships with my interviewees, and also help me interpret my data with more accuracy and sensitivity. Westbridge College was one of relatively few such organisations at that time to have been rated 'outstanding' by the Office for Standards in Education (OFSTED), the government inspection body for education: this is the highest rating possible and has been achieved by a very small (and indeed) decreasing minority of education providers in the further education sector as whole, so this college too, was widely recognised as being successful in its field. It was a general further education college with which I had had no professional relationship in the past. Permission was received from both organisations to recruit participants for the study.

In terms of the recruitment and selection of participants, and in line with my primary interest in 'DUI' rather than 'STI' modes of knowledge (Jensen et al 2007), the design required that my participants would be members of practitioner teams in each organisation, as it was critical that I collect data on informal interactions between practitioners. The participant information sheet (see Appendix 8.1) invited staff teams in each organisation to indicate if they were interested in being participants, after which I held briefing meetings and collected consent forms (Appendix 8.2) if they agreed. I was hoping for at least two teams of four or five staff in each organisation, with one member of each team formally designated as the leader (as I wanted to investigate modes of informal leadership in connection with learning and innovation). The Deputy Principal of Westbridge College set up a meeting where I was able to meet practitioners from different teams within the college to explain the purpose of my study and what would be involved for people who agreed to participate. My contact with TLZ put me in touch with two project team leaders, neither of whom had any connection with my earlier study, and as at the college, I met their team members to explain what would be involved if they agreed to participate. Following these briefing

meetings, one team of four practitioners from TLZ R&D, and three teams from WBC, each of three practitioners, agreed to be part of the study, as follows:

Participant Codename	Organisation	Team	Consent form	Focus group 1	Interview 1	Interview 2	Focus group 2
Sarah Thompson	WBC	HB	✓	23-10-15	08-01-16	24-06-16	12-07-16
Sue Yeo	WBC	HB	✓	23-10-15	08-01-16	24-06-16	12-07-16
Gemma Clark	WBC	HB	✓	23-10-15	08-01-16	24-06-16	12-07-16
Sally Miller	WBC	HU	✓	absent	absent	absent	absent
Beth Shore	WBC	HU	✓	23-10-15	11-01-16	absent	absent
Sam Jones	WBC	HU	✓	23-10-15	16-12-16	06-07-16	12-07-16
Geoff Robinson	WBC	MM	✓	23-10-15	12-07-16	absent	12-07-16
Matt Dylan	WBC	MM	✓	23-10-15	absent	absent	absent
Larry Smith	WBC	MM	✓	23-10-15	11-01-16	absent	12-07-16
Bill Rudge	TLZ	RD	✓	11-03-16	15-04-16	06-10-16	06-10-16
Pete Lawrence	TLZ	RD	✓	11-03-16	15-04-16	06-10-16	06-10-16
Harry Silver	TLZ	RD	✓	11-03-16	15-04-16	06-10-16	06-10-16
Will Dunn	TLZ	RD	✓	11-03-16	15-04-16	06-10-16	06-10-16

The WBC teams were all further education teachers, but working in three distinct specialist curriculum areas. One of these teams consisted of Humanities teachers, teaching mainly A Level students aiming to progress to higher education; the other two teams were vocational specialists, training students respectively for employment in the Make-Up and Beauty, and Motor Engineering

industries. This spread of four teams across two organisations and four specialist areas of practice, was felt to be satisfactory in terms of the range of specialisms, and practicable, given the time parameters available, in terms of the number of participants. Some practitioners across the four teams had worked for the organisations for many years, others were relatively recent recruits. Team members were generally located close together in the same physical locations within their organisations, and able to interact face to face on a daily basis. One of the TLZ team members, interestingly for the purposes of this study, was located in a different TLZ facility, 200 miles from the other three: he engaged daily and hourly with his colleagues using various internet applications. This type of arrangement was not typical in the company but quite common, and was seen, as we will find out in later chapters, in many ways to add value to, rather than detract from, the team's work. It is a limitation of the study that it was only possible to include one team from TLZ R&D in the study, but I was lucky in having a previous study of the organisation with a similar, overlapping focus and with a similar methodology, available to me (Derrick 2014).

3.3 Data collection

In this section I present the practical methodological strategies adopted in this study in relation to data collection, then move on to discuss the implications of these strategic decisions from a theoretical perspective. As the focus of this comparative investigation is primarily on the informal, social and cultural aspects of these workplaces, for which satisfactory objective measures and indicators do not exist (at least at the present time), a broadly qualitative methodology was indicated. I had a developing understanding that my aim to focus on practice would require a more

consciously ethnographic and phenomenological approach to research methodology than I had adopted in my earlier small case projects: furthermore, I wanted to design a methodology consistent with the emergent paradigm, which, as I pointed out in Chapter 2, constitutes what is essentially a phenomenological view of learning, attempting to see learning 'as it is', as far as possible uninfluenced by cultural biases or scientific pre-conceptions on the part of the observer (Merleau-Ponty 1945). This initially suggested that my primary data collection strategy would need to be extended to close observations of practice in specific contexts over time (see for example Levi-Strauss 1966, Hutchins 1995, Orr 1996): the data collected would consist of a combination of researcher's notes and narrative accounts of what the researcher saw. However, for practical and logistical reasons this was not a feasible option for me. A more practical alternative, but still consistent with the aims of the study, was to collect data mainly through interviews and/or focus groups. Semi-structured interviews and focus groups were selected as the main means of data collection because of the nature of the enquiry, and of the research questions, which are open rather than closed: the idea was that insights about the nature of learning and innovation at work would emerge from the data, rather than contributing directly to, or on the other hand contradicting, an already crystallised hypothesis. Semi-structured interviews, in which topics were introduced for discussion, would generate data more in the form of conversations than of answers to specific questions, and allow for each interview to follow different directions depending on the ideas raised by each interviewee. In this way interviewees would become co-researchers, and co-learners, with the intention of creating a 'mutual interpretive space' (Kvale 1996), discussed in more detail below. The idea was that the more practitioners engaged actively with the researcher's perspectives and objectives, the more potential insights into the research questions would be generated, and the more those insights would, from a phenomenological perspective, reflect practice 'as it is', as discussed earlier in Chapter 2 (Merleau-Ponty 1945,

Schatzski et al 2001). To optimise the extent to which the practitioners had the opportunity to become familiar with and understand the aims of the study, and to give them time to reflect on its key questions and develop their thinking about the issues raised by the study, I planned to interview the individual members of each team twice over a period of roughly six months, and to hold two focus groups in each organisation, for all the practitioners participating in the study, again with a six month gap in between. It was planned, and explained to the participants, that each of these interviews and focus groups would last about 1 hour.

There are at least four reasons consistent with this overall approach for making use of focus groups as well as individual interviews for the collection of data for the study: firstly, group discussions have the potential to generate ideas, comments and memories through interaction between participants both within and across different teams, which might not otherwise arise; secondly, they can provide a more relaxed context for authentic reflective and evaluative thoughts on practice to emerge, through a process of informal peer review; thirdly, they contribute, through this process of interaction between participants within and across teams, to improving the participants' deeper understanding of the aims of the study, thus helping them to provide richer and more relevant data on their practice, to the benefit of the study. Finally, the more informal and social nature of an appropriately-managed focus group may be more likely to elicit key information about the more informal and tacit aspects of work, which may be crucial data for a study with these concerns (Sim 1998, Robinson 1999).

My overall methodological approach therefore, aimed to achieve a balance between 'objectivist' and purely ethnographic stances, perhaps appropriately reflecting the debates between the standard and emergent paradigms of education discussed in chapter 2 (Beckett and Hager 2002). This approach also echoes and is consistent, as I will show later in this thesis, with

what the data collected in this and earlier studies suggest about the ways in which groups of practitioners share ideas about their work, reflect collectively on them, and generate new ideas which can be put back into practice. Furthermore I argue that that this approach, by encouraging and enabling a more actively engaged and contributory involvement of the practitioners participating in the study, allows informal aspects of workplace practice, which are the central focus of my research questions, to come to the foreground: these have largely been ignored in previous academic accounts of learning in the workplace (Jensen et al 2007), and are a key focus of this study.

On the other hand, any degree of engagement at a personal level between the interviewer and interviewee raises the issue, significant for both objectivist and ethnographic research perspectives, of the researcher unduly influencing the direction and content of the interview, and hence the data collected:

> *'Research must always start with a body of prior theory, if only to decide which set of 'collectable facts' should be collated or generated. It is this prior body of theory from which the researcher generates a particular hypothesis whose truth or falsity could be 'tested' by a particular selection of 'hypothesis-relevant' facts.'* (Wengraf 2001, p2).

This is an alternative view to the purest and earliest version of Grounded Theory (Glaser and Strauss 1967), in which it is held that knowledge can be wholly generated from data, seen as raw and unmediated. But Wengraf points out that however the data is analysed, it is unavoidable that decisions are taken by researchers about what counts as data, and about the selection of data to be analysed, through choices made about where and how it is collected: in other words a thoroughgoing Grounded Theory approach is unattainable Grounded Theory suggests the possibility of an almost wholly inductivist model of knowledge and theory generation, where theory

emerges from data, untainted by a priori assumptions (Glaser and Strauss 1967). Popper (1972), like Wengraf, but from a purely theoretical and philosophical perspective, also disagrees with this, arguing that knowledge can only be generated through deduction, from the testing of the analyst's *a priori* hypotheses. In my view, each of these positions is unrealistically purist. I agree with Wengraf's more moderate statement that strategically he is 'deductivist', but tactically he is also inductivist. This allows for the 'prior body of theory' and so for the framing of interview questions and data analysis within one or more prior hypothetical perspectives on the part of the researcher, while also allowing for unexpected or unforeseen ideas to emerge, and for more collaborative modes of investigation, with the more active involvement of the interviewees (Wengraf 2001, p3). Wengraf sees this as an example of the need for a balance between 'loose' and 'tight' thinking (Bateson 1972). From a purely phenomenological perspective, avoiding these tensions in research practice is impossible: the question in each situation is where the balance between these positions is located.

Kvale and Brinkmann (2009) discuss two contrasting metaphors for interviewers: as miners, uncovering nuggets of knowledge buried in the earth: 'the knowledge is waiting in the subject's interior to be uncovered, uncontaminated by the miner' (Kvale and Brinkmann 2009, p48); or as travellers, who continually interpret what they see and hear, constructing a story: 'the journey might instigate a process of reflection that leads the traveller to new ways of self-understanding, as well as uncovering previously taken-for-granted values and customs in the traveller's home country' (Kvale and Brinkmann 2009, p49). These contrasting perspectives echo the tension between inductivist and deductivist views of learning discussed above: in practice, any such study will produce both types of knowledge. The first type will be authentic facts about the interviewees' experiences of their work (though these will also be interspersed with their own evaluative analysis

and feelings about these facts) - there is no reason in my view, or in the views of methodologists such as Wengraf (2001) and Kvale and Brinkman (2009), not to treat these data as having as much validity as those produced by measurements. Secondly, this study aims to throw light on the characteristics of two specific workplaces which affect the innovation and learning that takes place within them. The point is that these characteristics emerge from analysis of the evidence revealed during the interviews – and to some degree this is a process of knowledge construction carried out collaboratively by both myself and the interviewees. The interviews are in fact conversations mixing questions of fact with discussions about interpretation of these facts, as demonstrated in this extract from one of the transcripts:

'WD We tend to keep things on the Confluence wiki….we tend to write little bits at a time, just to keep the information on the wiki up to date, and then towards the end of the project we write a more formal technote or something on that.

JD And who would have access to that wiki? Who would be able to add to it?

BR All of the team.

JD The formal members of the team.

BR Yeah, and actually some other colleagues as well, we open it up to people we are collaborating with, for example other members of our section, I just opened it up today to some guys across the road who we're collaborating with on a project.'

JD So it's, forgive me, I haven't worked on wikis very much, so you make a formal decision to include somebody in, a bit like a Whatsapp group or something like that.

BR I think generally speaking most wikis are open, fully open actually, and when I set ours up I chose to make it a closed user group because we had some commercially sensitive material on there to do with that.

JD So normally that would be the way you would do it.

BR So normally we are just fully open. But because there's some stuff that's commercially sensitive, and patent pending things, that we don't want disseminated, we keep it to a closed group, and when we collaborate with people we open it up to those people.' (TLZ Focus Group #1 189-208)

This extract exemplifies both the 'miner' and the 'traveller' metaphors for data collection suggested by Kvale and Brinkman (2009). In the first, the researcher is conceived as digging in particular spots in the hope of uncovering buried nuggets of relevant information; in the second as picking up insights more indiscriminately through 'going with the flow', and to some extent letting things happen. The difference between these approaches is about the stage in the process in which analysis takes place: before data collection and therefore determining the strategy for data collection, or following a less determined mode of data collection, in which case analysis consists of sifting through a wide range of data, much of which turns out not to be relevant to any specific research questions.

The approach to data collection adopted by this study aims to integrate these methodological approaches. Arguments for accepting and embracing the legitimacy of an engaged role for researchers, along the strategic lines I have adopted here, that is, from a perspective which conceives anthropological and social research as an essentially synthetic and ethical activity, rather

than a purely academic one, can also be found in Leiris 1950 (cited in Davies 1987, pp17-18), Flyvbjerg 2001, and Marchand 2017.

This brief discussion suggests that the use of semi-structured interviews and relatively open questions, and the aim of achieving a loose, conversational mode of interlocution, enabling a focus on the study's specific topics, is justified; this approach will also allow respondents to make potentially important contributions to the study through their own interpretation of the issues raised during the interviews. It also allows for the emergence and articulation of new ideas about practitioner learning during and as a result of the interviews, a process in which interviewees act as co-researchers. Schedules for the interviews and focus groups used in this study are attached as appendices 8.3, 8.4, 8.5 and 8.6 of this thesis.

In line with the data collection plan outlined above, 26 interviews (18 in WBC and 8 in TLZ) and 4 focus group meetings (2 in each organisation) were planned. The TLZ R&D schedule was fully completed according to this plan, with all four members of the team completing two interviews each and attending both focus groups. 8 out of 9 WBC participants attended the first focus group, and 6 out of 9 the second. 7 out of 9 were interviewed in the first round (at least 2 from each of the three teams), and 6 were interviewed for the second time: 3 from the Make-Up and Beauty team, 1 from the Humanities team, and 2 from the Motor Engineering team. In all, 23 interviews and focus group meetings were recorded and transcribed (19 interviews and 4 focus groups), out of a planned 30 (26 interviews and 4 focus groups).

I now move on to outline the approach to data analysis taken in this study.

3.4 Theoretical approach to analysis

Consistent with the approach to data collection outlined in the previous section, a developmental approach to data analysis was adopted. The broad method for analysis, as in the earlier studies carried out earlier in my Ed D, was thematic analysis of the transcripts of semi-structured interviews and/or focus groups (Miles and Huberman 1994, Gibbs 2007, Maxwell and Miller 2008). An initial group of 6 overall themes was derived from the literature review in the previous chapter, and then a small group of sub-themes or codes were selected for each theme. This produced a group of 23 codes grouped into 6 colour-coded themes or 'clusters' generated from the literature, which was used to start data analysis (see Appendix 8.8 below). Each transcript was closely read, and passages reflecting one or more codes were highlighted in marginal comments, in the appropriate colour for the cluster in which the code was grouped. Some passages reflected multiple codes, and if so this was indicated in multiply-coloured marginal comments. An example of a coded and marked-up passage from a transcript can be found at Appendix 8.11. Each time a passage was coded, this was recorded on a spreadsheet array consisting of cells for each transcript and code, a portion of which is attached at Appendix 8.10. Two types of entry were recorded: a positive occurrence of the code, or an occurrence which was either negative or in some way equivocal. Each entry was recorded in the form of the number of the line in the transcript in which it appeared. Negative or equivocal entries were indicated by being recorded in brackets. As this process of analysis and coding was carried out, amendments and additions were made to the initial list of codes, in a back and forth process which formalised the process of allowing findings to emerge from the data (for the final enlarged and amended list of 32 codes, see Appendix 8.9). This approach therefore exemplifies features of both Grounded Theory (Glaser and Strauss 1967), in which the codes are generated purely from the data, and orthodox thematic coding (for example, Gibbs 2007), in which the codes used for analysis are generated from the literature review, before the data is inspected. Following amendments to the

list of codes, data transcripts coded earlier in the process were revisited and analysed against the new or amended codes, in a further back and forth process in which again, findings were allowed to emerge from the data, in line with the theoretical discussions earlier in this chapter.

Following this first stage of the data analysis process in which the transcripts were coded, the second stage of analysis involved using the codes to identify the most salient features of the data from each organisation; in particular the features which were common to each, and those which were different (Robson 2011). To achieve this, in addition to straightforward inspection and direct interpretation of the coding spreadsheet, a simple quantitative technique was used to provide an element of objectivity in this process of prioritisation, which is interestingly not referenced in Robson's apparently exhaustive survey of research techniques (2011), at least in the context of studies which are primarily qualitative. Two numerical factors were calculated for each code: the average number of times it was recorded in all the transcripts for each organisation, and the percentage spread of its appearances (that is, the number of transcripts it appeared in divided by the total number of transcripts for that organisation, expressed as a percentage). These two factors were multiplied to produce a 'significance coefficient' for each code, in the transcripts for each organisation, producing a spreadsheet which can be found at Appendix 8.12. The data were then ordered by 'significance coefficient', and compared across the two organisations, a process which showed graphically the codes and clusters where the clearest similarities and differences between the two organisations were located (see Appendix 8.12). The passages in each transcript relevant to these codes and clusters were then cut and pasted together, and these re-organised collections of similarly-coded data were used to inform the discussions forming the different sections of Chapter 4 below. (A similar calculation was done for the negative/equivocal occurrences of each code: for almost all the codes in both organisations, these produced negligible

results, and so were ignored, apart from four codes in the figures for WBC, the implications of which also became elements of the survey of findings in Chapters 4, and also the more synthetic and comparative discussions of the findings in Chapter 5. This simple quantitative technique strengthens the analytical approach adopted in this study in a manner consistent with the overall design strategy, in which purely interpretive elements (the researcher identified incidences of themes in the data) are balanced with 'objectivist' techniques (ordering the significance of the themes numerically based on frequency and spread) as part of both the analytical process and data collection, as described earlier in this chapter.

The progressive stages of the Ed D have significantly developed my understanding of key methodological issues involved in qualitative research. I now confidently hold a practice-based view of research that recognises that all research has limitations, that no methodological approach is perfect, and that all research, whether qualitative or quantitative, has interpretive dimensions – in other words, that claims to objectivity made by some more positivist scientific researchers are mistaken (see for example Flyvbjerg 2001, Ziliak and McCloskey 2008).

From this perspective, it can be seen that the research questions designed for this study can only be answered meaningfully via an approach to data analysis which is fundamentally interpretive. The 'to and fro' techniques used in this analysis, moving backwards and forwards sequentially between the data and emerging interpretations of it, through which the analytical codes are refined and developed, is one way in which this interpretive approach is moderated. The other significant technique used here to provide 'distance' between the data analysis and the researcher is the comparative numerical analysis of the frequency and significance of each code for the two different research sites, as exemplified in Appendix 12. This approach highlighted those codes shared most between the two case study organisations, and those where the differences

were greatest: these codes became the starting points for the crystallisation of the study's findings (Chapter 4), and for the interpretive discussion of these findings (Chapter 5).

This chapter has described the methodological approach that was taken for this study. It has discussed the background to my thesis research in relation to the development of my thinking about methodology throughout the Ed D, and has outlined the strategic approach taken to the design of my study, data collection and to data analysis. It has justified these in relation to the nature of the research questions and a range of arguments in the literature on qualitative research, and finally this chapter has provided a narrative of how the study unfolded in practice. I move on in Chapter 4 to present and illustrate the study's key findings.

Chapter 4 Findings

4.1 Introduction

I now explore the interrelationships between practice, learning and innovation through the lens of the evidence from the investigation's two organisational case studies. This chapter is organised around salient features of the data from each organisation in turn, identified and selected using the analytical approach outlined earlier. Significant similarities and differences between the two organisations are pointed out throughout the discussion. In chapter 5, these findings will be integrated, evaluated and analysed in relation to the study's original research questions.

4.2 Westbridge Further Education College (WBC)

4.2.1 Informal relationships, team-working and social modes of working

The data suggest that teachers working for WBC are highly committed to their subject areas and to their work as teachers, proud of their expertise, confident of the quality of their work and generally proud to work for a high-performing college. They put a high value on the quality of personal relationships within the team, and between the team and the management of the college:

> '*if we've got work to do there's a few of us who stay late, and we order food in and go to the gym and things, so I feel it's a very social environment, so that's the way I think it works well, because often I don't feel like I'm doing work, I feel like I'm just hanging out with my friends.*' (BS#1 21-27)

WBC practitioners see the behaviours, attitudes and dispositions that support good relationships as the key to working effectively within the team and more generally within the college. The team-working structure is the arena within which the formal and informal aspects of work are intermingled, but they see the informal dimensions of their work as absolutely central to the expression and maintenance of these relationships: formal procedures, hierarchies, policies, curricula, etc are appreciated as necessary but not sufficient for effective practice, and particularly in times of change. This puts a premium on the expertise and personalities of team leaders, who are key in setting the tone of informal working relationships: their formal role in terms of college procedures is taken by WBC team members largely for granted, but what matters most for team members, for better or worse, is the personal relationships between each other and with their team leader. The respect team members have for their leaders is striking and expressed in a variety of ways:

> '*Nobody's micro-managing me…. individual autonomy….that is a key thing I've noticed in the team.*' (SJ#1 554-565)

> *'As my boss….she does an awful of things that I don't do, but then….she comes together with us and she joins in with everything that we are doing, and when we've got reports and things to do she also will help us….she's not going to segregate herself and say I'm Sarah, I'm the manager. She says 'well what can I do [to help], girls?''.* (CG#1 68-73)

The day-to-day mechanics of team-working are the interface between formal work processes and requirements, and the informal, perhaps implicit or unstated, dimensions of practice that help get things done:

> '*We've got [a colleague] who is dyslexic…a small presentation that somebody [else] would knock out in a few hours….that could run on for weeks for him….so he doesn't feel devalued, you use his strengths in other areas, practical elements, we all sort of get around and discuss it. Instead of creating, say, electronic resources….we get him to cut up parts of a car and section them and they go in the classroom, the feely touchy stuff, so he's in his element.'* (WBFG#1 125-137)

This demonstrates how effective team leadership in WBC involves continually taking decisions based on judgements which inextricably involve both formal and informal aspects of the context. Sue, a very experienced member of Sarah's team, has chosen not to take a team leadership role:

> '*I was offered section manager job a few years ago, I did it as an interim for a year while the section manager was on maternity leave, I felt I did fine, learnt a lot actually, glad I did it….but…. I know from my own personal sort of skills….that I am best in the [Course team leader] role and there are other people out there that were better for section manager, and I was happy with that'.* (SY#1 337-343)

The decisions Sue takes in her role as curriculum team member and in her teaching, are similar in nature and complexity to Sarah's, but don't involve her being formally held responsible for the work of other individuals: her sense of professional fulfilment is satisfied as a curriculum team member, working with colleagues in whom she has confidence and in a subject area which she knows very well indeed. A sense of professional autonomy is important to these practitioners: they are happy to be managed, but strongly value management styles which trust them to know their business and to do a good job. The respect practitioners have for their team leaders is matched, and perhaps reflected, by the team leaders' consciously expansive approaches to their leadership role:

'*I think [my] style of management is the way I'd like to be managed, you know, not dictatorial hopefully….we are deemed in the college to be a very good team, so hopefully that's some of my inputs….You haven't always got the answers: these guys are coming up with fresh ideas and innovative stuff, and you think yeah, let's go with it….I think that's why it works, because they are given their own head….it's not just me telling them….I know it's an old adage, but unless you try you don't know [what might work]….my role is to….back them, you know, fully*.' (GR#1 39-78)

'*You can't lay down the law….say to somebody you must make this – [well], you could but…it's not good management, you resent it….we tend to use a different approach, so you have a chat and then….slowly people buy into it*'. (WBFG#1 292-303)

This mutuality is valued by team leaders and their team members, not simply because work is more congenial when collegial relationships are relaxed and friendly: they see the quality of these informal relationships, and the features of the workplace that enable and support them, as critical to effective working in the present climate of external pressures around audit and quality, and of technological change.

4.2.2 Discretion and trust

A second prominent feature of the WBC data is evidence about the extent and limits of discretion afforded to practitioners within the organisation, and, intimately bound up with this, the extent to which practitioners trust their organisation's competence and values. A high degree of discretion is afforded to WBC practitioners and team leaders in their day to day work:

'*we are pretty much left to our own business….as long as they don't get too much grief from above they let you get on with it*'. (WBFG#1 309-312)

'*I have a very supportive head of school….they [are] very much [saying] 'you manage it in your own way, Sarah' '*. (ST#1 80-82)

However, this picture is not uniform: there are aspects of the work of the teams in which they are given less discretion, an example of which is the organisation of college staff training days:

'*I sometimes get frustrated because we can't [organise our own] CPD….sometimes we have gaps between training. So….I say look I haven't got training in the afternoon, can I go back to [my office]? And it's very much no you've got to stay at Westbridge [other site]. And I think….why can't we have some of the training days down here?….that is a real bone of contention'*. (ST#1 459-499)

The planning of CPD, at an organisational level, seems generally to be non-discretionary: the college wants to get teams to come together across disciplinary boundaries for CPD activities, which would in principle create powerful opportunities for professional learning, but in practice this project is approached as a bureaucratic task, there is little consultation about the content and the materials, and logistical arrangements are not planned sensitively enough or with sufficient local knowledge. The fact that practitioners are irritated by this testifies to their professional pride: they see these occasions mostly as missed opportunities, whatever the good intentions of the college senior management. Sam gives another example illustrating the limits of discretion within WBC:

'I think the style of leadership [of our section] is what I would describe as a quite democratic approach, we have a fairly decentralised decision making process, without wanting to swallow a management textbook but it does tend to err to that side, that there isn't a great

deal of top down 'you will do it this way'. We are encouraged to consider the questions but to come up with ideas from below to how we might solve those problem….[the introduction of the new scheme for monitoring progress] illustrates the fairly rare occasions when it's top down, whereas there are many other instances, for example talking about how we can improve 'stretch and change', where it's been much more left to us as teams and individuals to make our decisions, to decide what's the best way to do that' (SJ#2 234-246)

Geoff is a very experienced team leader, and sees his own approach to leadership as having been developed though this high-trust culture:

'*I struggled with that in the beginning, giving people ownership, because I built this department, I'd seen it growing, and I was quite reluctant to let other people come in, not because I felt they could do it better, but I didn't like losing ownership, though you have to sometimes, as it gets bigger, just give it to people'.* (GR#1 61-65)

He gives a highly practical example of discretion in action at WBC:

'*the college wanted a whole week's induction, which is, for our type of learner, just too full-on. They [the new students] don't like it, you know, they don't come back three or four days into the course, because they want to work on cars. So we are changing the [induction], shortening it…I think you can induct several weeks into the course, feed it in naturally, bring in the cars quite early, get them onto the cars, and then put in some of the stuff they may not want to do. We found that if we did the metal task [too early] that could switch them off a bit*' (GR#1 203-210)

He continues: '*I think with experience you know….what you can do, what's more important and what could be left*'. (GR#1 287-288). This is evidence that in practice experienced team leaders can

choose not to comply strictly if the requirement isn't important, indicating that there is *de facto* discretion: either that there are gaps in the monitoring system, or that experienced and expert practitioners' judgement is given discretion by the organisation: which tacitly recognises that practitioners' judgement about compliance may be better than SMT's.

These points suggest that (a) there is a high degree of discretion (and therefore trust) afforded to teams by the college, and to individual practitioners within teams; (b) the boundaries of this discretion are not strictly and explicitly defined, and may be tested in practice – this lack of definition is one of the dimensions of informality within this particular workplace context appreciated by practitioners as supporting their work; (c) there is a high degree of agreement between the organisation and practitioners about those formal procedures about which there is no discretion (most of these are determined externally, by awarding bodies for example, or by OFSTED).

4.2.3 Stability and 'reification'

The data suggest furthermore that a highly significant feature of the context for the work of the WBC's practitioners is their perception of the stability of the college as a high-performing organisation. This is based on their awareness of the history of the organisation, its steady and long-term commitment to its public service mission and its espoused values. They are also aware of the stability and effectiveness over a very long period of the senior management team, as evidenced by the length of service of successive principals and other senior managers, by reports from a range of external regulatory organisations, by its annual student attainment and progression results, and by its secure financial position (fairly rare among comparable colleges). Particularly

important is the sense staff have that their institution is reasonably secure; that it will continue to navigate the uncertainties of the business, policy and funding environments with expertise and wisdom, and at least to some extent shape its future, rather than simply lurching reactively from crisis to crisis. Sarah in particular has experienced instability in previous employment and values reliable, competent leadership very highly – so for her the stability of the organisation is central to her sense of trust and security:

> *'….having come from a college that grew and grew, they took on academies, they were doing things abroad…. I was there when we were 'outstanding' and we went completely down to a three[1], and investigations and all sorts, so yeah, I saw everything there, which was a great shame'*. (ST#1 843-850)

This perception suggests that WBC practitioners feel that their own job security is to a large extent in their own hands: their collective professional expertise and judgement, exercised within the strategic resources of the college as a whole, is likely to be their best guarantee of continued secure employment, and in this they feel they are 'better off' than many fellow practitioners in other employers in the sector. However, the relentless pressure to work to high standards has been too much for some people:

> *'I know there are people that have decided it's too much here and they go elsewhere, you know, the grass is greener, but it's not necessarily always greener'*. (WBFG#2 859-862)

Over time, the consistent college focus on high standards and outcomes has tended to ensure that most of its staff are practitioners who prefer performing to higher standards.

[1] 'outstanding' and 'three' refer to outcomes of college inspections by the government's Office for Standards in Education (OFSTED), which are Outstanding (grade 1), Good (grade 2), Requires Improvement (grade 3) and Inadequate (grade 4).

Apart from security of employment and pride in working to high standards, the other clear central motivation for these practitioners is a public value ethos: the point of effective working is to support their students' learning, progression and achievement. What these teachers mean by this is not necessarily identical with official indicators of success in the form of numbers of qualifications gained, or the raw success rates of their students in gaining employment, because they value effort, on their own and on their students' part, even if this isn't always rewarded in terms of qualifications or employment. One member of the Hair and Beauty team, 'definitely not a maths specialist', as she says, has agreed nevertheless to fill a gap this year, due to a shortage of specialist maths teachers across the whole sector:

> '*this year I'm teaching maths and it's not my chosen subject, I wouldn't choose it if I had to….when they couldn't find enough teachers then they had to call upon us….so I just had to say to myself well yeah, there you go, you have to do it, you have no choice, it's almost like you are a brave soldier, you are going in there and you are doing it. And I think I'm doing a good job! I think it's the enthusiasm that you have when you are teaching something like that.*' (GC#1 245-306)

Gemma's attitude to this situation demonstrates, from perspective of public service, a high degree of professionalism: the job has to be done, the students need to be taught, so someone has to step up and take it on. It also demonstrates a powerfully social perspective on learning – 'I think it's the enthusiasm you have' – and confidence in her capability to find ways to do the job sufficiently well, irrespective of any arguments from the subject specialist perspective that the job should be carried out by a trained mathematics teacher. It also demonstrates her positive attitude towards, or even enthusiasm about taking on new challenges.

This also demonstrates the WBC practitioners' consistently-held view that the full range of potential benefits of education is not measured easily or realised in the short term. Furthermore most of them are highly aware of the importance of their college as an institution that has served the local and sub-regional community for many years, and they generally share its stated values and objectives. There is some awareness among them of the history of their college, and with that a sense that effective and committed working is a contribution to maintaining its stability and continuing existence, not so much in order to secure their own employment, though this is of course important, as because of the long term benefits brought by the college to the local community. The confidence and security the practitioners feel about their professional identities and expertise is tied closely to their confidence in the organisation, their awareness of its long-established position in the community, its role in the wider civic society as an element of public sector provision, and the consistency and stability of its mission. The newer staff among the research group evidenced the importance of this sense of stability just as strongly as those who had been with the organisation longer, and in fact the most recent recruit in the group emphasised this as strongly and explicitly as anyone else, comparing WBC favourably to previous organisations he had worked for:

> '*this college, I feel, has put together a set of procedures and processes which can be referred to by new and existing staff, which achieves student success, and therefore organisational success, around a consistent workable effective process….that's one of the reasons why it's successful.*' (SJ#1 574-578)

This emphasises the importance of 'reification', in the sense of the formal explicitness and standardisation of work processes, procedures and requirements, as a key factor in enabling effective team-working (providing a common framework for discussing and improving work

processes) and without which consistency of quality and work across the organisation, and over time, is unlikely to be achieved. This is exactly the sense in which 'reification' is used in Fuller and Unwin's Expansive-Restrictive Continuum (2004), as an indicator of 'expansiveness'.

The specific practice referenced by all the WBC practitioners that exemplifies 'reification' in this sense is that of developing banks of teaching and learning materials and resources in digital formats that can be shared and collectively updated within the specialist vocational teams. Different reasons were given for the value of this practice, but central is the value of standardised resources in supporting part-time team members or new recruits, to become fully-integrated into the teams:

> *'....back in the day we were quite reliant on agency staff coming in, and with OFSTED always hanging over your head, your agency staff are always going to be your Achilles Heel, and we found that the agency delivery of teaching was the bit that we were going to get hammered for, so by sharing these resources we also upped their game, so that they had stuff.'*
> (WBFG#1 159-163)

This neatly demonstrates the WBC practitioners' belief that highly-integrated teams are necessary for their work to be carried out effectively: that 'reification' is important in providing a framework for the social and informal dimensions of team-working, just like a common staff eating space, or time available between teaching for informal chats. This role doesn't preclude its importance also in supporting consistency of practice, common standards of quality, and fairness.

Creating these resource banks does not appear to have been a formal work objective set by the management of the college, yet all three vocational teams have recently devoted significant time and resources to this practice, two of them sharing the work involved informally among team

members, with the third identifying resources for one team member to be formally allocated the task of leading the project, and carrying out most of the actual work, though not without consultation with the other members of the team. Team members and team leaders saw the effectiveness of this work as depending primarily on the involvement of the whole team, and that this work was primarily social and informal in nature, involving sharing of materials, resources and insights in a largely informal manner, and often to some extent in individuals' own time. This perception was also true of the team which adopted a more technocratic approach to the project: the designated project worker was working on behalf of the other members of the team. In each case the materials and resources bank produced reflected not just the requirements of the various official vocational curricula, but also the personalities and specific expertise (both vocational and pedagogical) of the individual team members.

Once developed, these resources and materials have the potential to act as a focus for collaborative team development and innovation (that is, as 'employee-driven innovation' (Høyrup et al 2012) in which the resources and materials act as 'artefacts' (see for example, Engestrom 2008, Hoyles et al 2010). However, it is clear from the data that realising these potentials was not the only, or even main, reason for engaging in this practice. Additionally and perhaps more importantly, practitioners expect these digitised resource banks to enable them carry out their work more efficiently (that is, to save time in teaching preparation), and at the same time to be able to demonstrate increased consistency in their work. This strategy was also seen as potentially addressing the sector-wide imperatives to teach and support more students within declining funding envelopes, and to move towards a more standardised model of pedagogy and of curriculum, as increasingly required both by external quality assurance inspectors, and by students concerned about fairness and equal treatment.

The project of digitising curriculum resources and materials by the vocational teams within WBC has the potential for supporting both expansive innovation (in which the resources can be used as the 'launchpad' and focus for continual collaborative updating and improvement) and, contrariwise, a more restrictive standardisation of work in which teachers may be encouraged to use the same, unchanging resources and materials in their teaching – supporting, in other words, a framework which tends towards measurably identical and static practice rather than a dynamic range of appropriate but different practices which nevertheless can maintain consistency of quality. These two sets of potentials, contained within the same practice, are effectively 'entangled', and this complex feature of practice, evidenced in the data from both WBC and TLZ, is, I will argue more fully in the next chapter, a critical focus of practice however much the situational context is 'expansive' or 'restrictive' (Fuller and Unwin 2004).

4.2.4 Social conceptions of learning

The fourth salient point emerging from the data is that individual WBC practitioners generally understand that learning at work is a social process: we have already seen that they see the informal dimensions of work, within which social modes of working operate, as both more congenial and as helping them work more effectively. A key indicator of this for them is the willingness to share ideas, expertise and resources:

> '*I've been with the team just over a year….it was refreshing to come in as an outsider….the shared resources, how refreshing was that, there was nothing that's got anybody's name on it. I thought, you know, hallelujah, because I've worked in other FE colleges where it's like 'ooh this is mine, you are not having that*….' (WBCFG#1 212-217)

They also strongly and consistently affirm the value of professional learning through practice, through mistakes, through life experiences and personal transitions, and they value having time as part of work for informal conversations and social interactions. Such opportunities are provided by their organisation, to some degree, which suggests that WBC strategic planning makes use of social theories of learning., whether these are explicit or not.

The ways the WBC practitioners speak about their teams, the way they learn collectively, through bad experiences as well as good, and the learning of their students, consistently suggests social conceptions of learning, whether clearly espoused or not (Argyris and Schön 1978). This description of one team by the leader is typical:

> '*I was a course team leader for five years and have been section manager for seven….it's fourteen staff with….a nice mixture of more experienced, shall I say, as opposed to older, and some real young guys that come straight in from industry….[Larry, he's] at the beginning, and we see him as a star of the future, he's brilliant*.' (GR#1 20-30)

The same team leader talks about his pedagogical role in relation to his team:

> '*Yeah, and also you haven't always got the answers. These guys are coming up with fresh ideas and innovative stuff, and you think yeah, let's go with it, and go with it and now I think as well that's why it works, because they are given their own head, if you like, it's not just me telling them….I know it's an old adage, but unless you try you don't know.*' (GR#1 67-78)

It's clear that Geoff sees his work as being concerned with experiment, trying things out, learning from mistakes, innovating, and with good ideas coming potentially from young, new members of the team.

4.2.5 Organisational Leadership

The earlier discussion of trust and autonomy also provides evidence about leadership in the college. The extent of discretion afforded to teams by the college is matched by a clear sense of trust among the practitioners interviewed: that the management of the college 'know what they are doing' and that the values and objectives of the organisation are broadly aligned with those of the staff. The internal quality assurance processes at WBC are seen as constructive, formative and pedagogical: departments and teams propose their objectives and plans within overall college objectives, and justify and explain these in face to face meetings with senior managers. Management in general respects the expertise and industry knowledge of specialist teams, generally approving plans that are well-founded, especially if they do not involve financial risk. Practitioners were ambivalent about this: there was a clear sense of professional security in working for a college which appears to be financially secure, following sustained and effective financial strategy and management over a long period. However at times management were also seen as cautious and averse to risk: Gemma in the beauty team identified a development possibility and applied for support to take a camouflage make-up course, but this wasn't agreed by the college. She paid for it herself, gaining the knowledge and the qualification, and this programme is now being offered by the college:

> '*I did do it on my own back, and now they are using it…. I wanted to do it, if I didn't want to do it I probably wouldn't have done it and then they may have got someone else in the school to do what I'm doing now.*' (GC#1 758-760)

On other occasions, however, teams have been successful in making cases for resources for development:

> ‘*one of the things that I’ve pushed for this year [to] convert one of the salons into a makeup studio, very, very appealing for those learners….it will be a bespoke makeup studio….it was a case of, you know, putting in the capital bid….and they’ve actually said yeah, you can go ahead with the studio.’* (WBFG#2 255-262)

So even though not every proposal to senior management for development funding is agreed, practitioners in general trust that management decisions are made in the best long-term interests of the college: the evidence for this judgement, as already noted above, is the long record of high-achievement by the college, and the stability of the management team: *’They are definitely forward-thinkers, definitely*.’ (WBFG#2 796-804)

The extent to which leadership in WBC is diffused or centralised is signalled in conflicting ways in the data. Staff and management clearly agree about the primary strategic goals of the college, which are largely out of the college’s control. Practitioners enjoy some autonomy but it is strictly limited and circumscribed, so that leadership cannot be said to be strongly diffused. This autonomy is limited further in scope by reductions in curriculum and staffing resources over recent years. Furthermore, there is undoubtedly a pronounced hierarchy within WBC, but this is seen by practitioners more as an appropriate division of labour within the organisation, given challenging externally-set achievement targets, than a structure legitimising the inappropriate or incompetent exercise of power. One practitioner, with experience as a senior manager in a previous job, describes managers as ‘protecting’ practitioners from the worst effects of the accountability requirements (SJ#1 618). He takes the hierarchy for granted, but is enthusiastic about the diffusion of a positive leadership style throughout the organisation:

> ‘*there are colleges you can go to where there’s a sort of general hatred of senior management or even middle management, utter resentment, the managers blame*

the staff, the staff blame the managers, and it's a really unhealthy toxic atmosphere, quite different to here, [where] I think there's a dividend of high performance leads to that legitimate power. The other strength that senior management have [here] is they have a nice way of doing it, without personalising it….they have a way of communicating their intent, objectives that we need to achieve as a college…that is empathetic, is clear, and is therefore effective. That, I think, trickles down, they are good role models. Lower down the echelons I think middle managers pick up on that, they adopt a similar style' (SJ#2 485-517)

The credibility of the leadership team is high, based on their stable record of achievement, and on their collegiate and supportive behaviour. But these conditions have not produced the kind of paradoxical leadership qualities called for by Beck (1994), or a flatter hierarchy as suggested by the literature on organisational development discussed in chapter 2 (see for example Felstead et al 2009). WBC leaders respect and appreciate the expertise, commitment and hard work of their staff, but they cannot afford, it appears, to distribute leadership in the sense that Beck means it (1994), too widely, and there is no explicit acknowledgement of any need for 'double-loop thinking' (Argyris and Schön 1974, 1978). Leadership in WBC does, on the other hand, exemplify Beck's idea (1994) that the personal and behavioural characteristics of individuals in leadership roles should embody values and objectives that are clear and command the respect and commitment of staff in general.

4.2.6 The experience of pressure

A recurring feature of the responses from WBC practitioners is the extent to which the experience of work is characterised by a sense of pressure to perform quickly, to work fast to deadlines set ultimately by external agencies, or in other words, the feeling practitioners have that they have too much work to do in the time available to them. In general, the WBC practitioners feel constantly under this kind of pressure, which is produced by the simultaneous contextual factors of declining budgets and high-stakes accountability measures for colleges. College managers have little option but to organise, control and monitor the activities of their staff to serve the government's accountability measures, even if these aren't aligned well with the organisation's mission and values, or reflect the nature of all aspects of the college's work. For example, the Hair and Beauty team have been redesigning their programmes in line with changes in key qualifications made by the awarding bodies, and with changes in the assessment regime determined by the government. This task needs to be finished in time for the new programme to be implemented for the next intake of new students: schemes of work and materials need to be adapted, staff development needs to take place, timetables need to be amended, etc. At the same time, it is the busiest time of the assessment year:

> '*all our involvement right now is on exams and finishing the students…. I don't think we have time to have anxiety right now, because….our focus is really just making sure the students are all complete.*' (GC#2 67-102)

There is in practice less and less time for informal developmental interactions, for collaborative reflective review of work by curriculum teams, and for 'trying things out', or for activities that add value to the students. The Beauty team have traditionally held an annual Mothering Sunday event to which the public are invited, involving students, but it had to be dropped this year – as the team leader said:

'*I said [to the team], you are all up to hours in the week, you are covering, and you are coming in at the weekend….do you really want to be going to bed on Saturday night thinking how many students am I going to have on Sunday? Do you really want that pressure?....[and they said], oh we make a lot of money on Mothering Sunday. And I said yes, we do, but ultimately if you put the income generation side of it….[but if] you have a day off on the Monday, it's not worth it…so we are not doing it.*' (ST#1 215-225)

Team members recognise that some pressure can help them perform better, but even the most experienced practitioners at times admit to coming close to not coping, for example in relation to the possibility of an OFSTED inspection:

'*I know I'm a good teacher but I'm almost feeling that when they come in I'm just going to fall to pieces because of the pressure that's been built up for so long'* (SY#2 682-684)

This pressure isn't felt to the same degree by all practitioners in WBC at all times, but it is a constant contextual factor in the background, shaping their feelings about their work: this is an integral characteristic of WBC's 'productive system' which will be discussed in more detail in the next chapter. WBC practitioners feel that they have to do everything that is required, whether they have enough work time or not. It is primarily their commitment to students rather than to the organisation, which creates a situation in which teachers effectively exploit themselves. But they understand that the organisation is in a similar situation, including the senior managers, and this may explain why the issue of trust is so important in this context.

The working context for WBC practitioners, then, highlights the tension between working to comply with the requirements of external agencies, and working expansively and innovatively. For the organisation, teams and individual practitioners, working expansively and innovatively is made

difficult because there isn't sufficient time for reflection at any level; and because the organisation's primary concern has to be compliance with shifting external requirements, rather than with any kind of pro-active development. The organisation can allow discretion, an essential component of expansiveness, but only within a strict framework of compliance:

> '*And I've got to say, 'Sue, can you give up three hours of your DD to go and cover a practical?' That's massive, when she's got a load of marking to do….that's a huge ask, and sometimes I say, 'Look, can we split it?' - you know, to show that actually we are both up against it, but if we can…and that goes a long way I think*'. (TS#1 113-130)

The team leader's ability to ensure her team gets its work done depends critically on the trust relations within her team: she is constantly working to maintain these relationships, but only, in a manner of speaking, to keep up; this double-bind is reflected to a greater or lesser extent, at all levels of the organisation.

For TLZ R&D, on the other hand, project work to a much greater extent is allowed to take as long as it has to, and decisions about whether a project is finished or not are made with the close involvement of practitioners at all levels. Time for reflection is a critical difference between the two organisations, and has direct consequences for innovativeness, according to one TLZ practitioner:

> '*An important trait to foster innovation is…. transparency. And what I mean by that is the passing on of information and knowledge, as distinct from the hoarding of information and knowledge….Some people see knowledge as power and use it as a means of controlling other people, but that is a barrier to effective innovation, what you want is transparency and information to flow freely. Just the same as financial markets: people make profits in*

financial markets because of the imperfections in market flow, because one person doesn't have complete knowledge of the market and therefore can't work out what the true value of something is.' (TLZFG #2 511-522)

'*A lot of innovation is about questioning things, not just in the heat of the moment but to think more long-term about stuff.*' (TLZFG #2 684-685)

Support for this kind of 'long-term' reflectiveness in TLZ comes not just in terms of time, but of structured opportunities, as we have seen, for informal discussions with close and more distant colleagues. This kind of activity does take place at WBC, but is likely to be hurried, or to take place in staff's own time.

TLZ's project teams deliver 'products' ready for the next stage (perhaps for branding and taking to the marketplace); when a particular product is ready in this way is a decision taken within the organisation: there are rarely external agencies making non-negotiable demands. For WBC, the externally-defined system of accounting for teaching and learning allows for little local discretion, and it does not negotiate. WBC practitioners have to a large extent internalised the idea that this is the nature of their work:

'*It's very, very full on {as a section manager]. You are so operational, fifteen hours of teaching a week, then you've got all of the other stuff to do, it is a very, very, heavy workload, I think as an SM we should have less contact, it's heavy, and, you know, managing your team, and also I've got two areas to look after, both public operations, so I am not only supporting the curriculum….I do get frustrated when people come and say can you do this in hospitality, can you lay on sixty cup-cakes, or beauty, can you support the Local Authority Carers, and just do it like that. Sometimes I have to say no, but sometimes I*

can't say no because there is an expectation….This time of year….[we are} definitely [working over our hours]. I'm getting that overwhelming feeling, eleven course reviews to complete, um…you know, eleven appraisals….I've got colleagues in other further education colleges, it's exactly the same'. (ST#2 641-672)

4.2.7 Summary of findings from WBC

The data suggest that at the organisational level, WBC sees strategic planning primarily as a challenge in predicting and responding to changes in the policy and funding environment, rather than aiming to shape these changes. The curriculum teams engage continuously in environmental scanning, using their industry partnerships and through close monitoring of changes in the qualifications frameworks, so as to keep abreast of changes in technology and practice in industrial workplaces. In the Hair and Beauty vocational area an opportunity was identified to develop a new training course in camouflage make-up, responding to developments in the film and media industries, but the college didn't agree to pay for a staff member to attend the necessary training programme. The course did eventually run, after one member of the team paid for herself to do the training, as was noted above. Overall, the data from WBC suggest that innovation is not an aspect of work that is uppermost in the minds of the practitioners or indeed of the organisation: they see their role primarily as aiming to achieve nationally-set goals, and to reconcile these with the needs of their students and the local economy, within funding and quality parameters over which they have limited control. The practitioners are conscious of the potential tensions in this situation, but in general see themselves as aligned in their professional work with the overt aims and objectives of both the national policy framework and their organisation as a whole, which are concerned with providing effective vocational training to support their students into employment in

local and regional industries. They are in most respects happy to see their work as aiming to comply with these broad objectives, even if it often seems that the resources available to them in terms of time and funding may not be sufficient: the improvisational strategies they devise to address these logistical challenges, as well as the ongoing work of exercising their expertise as vocational subject teachers, are the twin foci of their professional ingenuity and team-work. In this they see their organisation as providing a broadly enabling framework of support: the practitioners understand that for the most part their resourcing challenges are outside the control of the organisation. Although WBC practitioners are aware of needing to be flexible and adapt as their jobs change, under constant pressure of time, they appear mostly to exercise this flexibility in an improvisational mode aiming at complying with requirements set externally, rather than as part of an active, strategic and positively innovative process. This is a further example of the way different analytical perspectives on developments in these workplaces are in practice essentially entangled.

This section has highlighted the key findings from the data on WBC. They suggest that WBC practitioners are expert and resourceful, and that they put the highest value for the effectiveness of practice on the informal, social and personal aspects of their work, and on the extent to which WBC enables these to flourish. WBC is characterised by high levels of trust between staff and managers, and also by the significant discretion afforded to practitioner teams in their day to day work. This discretion, however, is strictly limited, operating within a largely non-negotiable framework of externally-set deadlines, administrative requirements, and financial limits. WBC has been successful over many years in satisfying these requirements as a whole college, and effectively delegates the same expectations to its curriculum teams: monitoring is light as long as targets and goals are met within the resources available. The stability of WBC's structures, governance, management team, and many of the practitioners too is a key factor in providing the confidence at

all levels in the organisation on which high trust levels depend. Curriculum teams are all engaged in an ongoing project of digitising and standardising their curriculum resources: this project, which does not appear to have been an institutional requirement, is driven mostly by the need to save teaching preparation time, and to enable consistency of practice between the work of different teachers within the same curriculum area; however, it could in principle also provide a platform for innovative developments in teaching and learning. The potential for this is severely limited in practice by the continually increasing time pressure experienced by all practitioners, whose commitment to their students' success regularly leads to them to work more hours than they are paid for.

4.3 TLZ Research and Development (TLZ R&D)

I now turn to the key themes that emerged from the data collected in the TLZ R&D case study. These themes were selected on the basis of the prioritising procedure described in chapter 3. I start with data on the significance in TLZ R&D, as in WBC, of informal relationships, and social modes of team-working. This is followed by presentations of the TLZ R&D data on crossing boundaries, both organisational and in terms of specialist domains of knowledge; on the extent to which TLZ R&D is an expansive organisation featuring expensive leadership; and on the key practices within TLZ R&D of informal 'peer review' and 'writing up'. Some of these themes are significant for both organisations, but some represent significant differences between the organisations. Where this is the case, these differences are highlighted and explored.

4.3.1 Informal relationships, team-working and social modes of working

The data from TLZ R&D suggests that its practitioners, like their counterparts in WBC, strongly value the informal and social aspects of work and learning, not just because this is comfortable and congenial, but because they see these modes of practice as essential for the effectiveness of their work, which in the case of TLZ is explicitly directed towards innovation. This is exemplified by the number of responses highlighting the importance of opportunities for informal social interactions within normal work processes:

> *'we generally sit around the kitchen table at lunchtimes, so I get to chat to a lot of people in the other groups that are up here…. Some of it is just being aware of what other people are up to – for example I was talking to someone about traffic shaping, just the data coming down over the network, and RJ came around the corner, because he sits near the kitchen, and said oh we've been doing similar stuff but we've been doing it this way instead. So we got into a discussion about how it could be done another way….So there was that sort of knowledge that I know that his team has being doing this, and been involved in it, so I know now if I need to do anything with high bit-rate traffic-shaping I can go and ask him.'* (TLZ Focus group #1 146-163)

> *'people from different organisations and backgrounds we have no idea of, with perhaps an interest in technology, can try things out, provide feedback. And the reason that's useful is because, you know, it's crowdsourcing the problem'* (PL#2 196-199)

In these accounts of informal workplace practices from two different TLZ practitioners we see social theories of learning being put into practice, as well as a culture of working across domain boundaries, and informal but work-focussed relationships supporting innovation, through the valuing of contingent knowledge which even if not needed immediately, may have value in the future. The point here is not so much that these features of the workplace are made explicit, but

that the environment and the dominant workplace culture are intended to produce these affordances and ways of working.

Also highlighting the importance of the informal culture of the TLZ workplace, are the frequent references to the role of experienced colleagues, new team members and colleagues from partner organisations as 'peer reviewers': it is normal and expected practice to share ideas and data, not just within the team, but with colleagues in other teams and potentially with people outside the organisation. Sometimes this is to get a 'second opinion', or to help solve a specific technical problem or overcome an impasse; at other times there may be no particular purpose for the interaction, but merely the sort of informal conversation that takes place at informal social events set up simply to enable and encourage such conversations. The tendency occasionally found among individual practitioners not to want to share their work in this way, perhaps because they fear they may have to share the credit for it, is strongly frowned on:

> '*if your only value as an employee is the knowledge you bring into an organisation….once you've given those crown jewels away you have no value….in an R and D environment that's just not how we work, how we work is we are constantly accruing more knowledge and expertise and the value of the individual is in their ability to soak up that and process that information and socialise that information.*' (BR#1 111-116)

> '*an important trait to foster innovation is transparency….the passing on of information and knowledge, as distinct from the hoarding of information and knowledge….some people see knowledge as power and use it as a means of controlling other people, but that is a barrier to effective innovation, what you want is transparency and information to flow freely….just the same as in financial markets,'* (TLZ Focus group #2 510-518)

The expansive orientation of the organisation discourages any tendencies not to share knowledge, by allowing high levels of discretion, providing effective and informal communicative channels, supporting collective working and sharing of knowledge – in effect, treating practitioners more like partners in the enterprise.

The role and practice of peer review is both formal and informal: typically the formal and informal aspects are not fully separable, and it is this inseparability, or entanglement, that gives it its utility. A key implication of this prioritising of the sharing of work, both formally and informally, not just with close and experienced colleagues intimately connected with the work, but with new and inexperienced colleagues within the team, colleagues who are not members of the project team but who have expertise in contiguous domains of practice, and sometimes with people from other departments or organisations altogether, is that to engage in this practice requires continuous crystallisation of the latest stage of development of the work. This may be expressed to various degrees of formality, depending on the nature of the occasion for sharing, and on the level of familiarity, or level of expertise, of the peer practitioner the work is being shared with. All the TLZ practitioners explicitly emphasise the importance of various modes in which work is 'written up', in a wide range of levels of formality and comprehensiveness:

> '*I've got my logbook full of low level details, I established some level of understanding, able to write about that a bit more clearly, pass that around, then at some point decide to put these questions onto [the project wiki] myself, ….key learning outcomes, or key unanswered questions at this point in time that we know will need to be answered, and try and figure out what resource is required to develop that information further*.' (TLZFG#1 243-250)

This demonstrates clearly the extent to which 'writing-up', however formal or informal, is integrated into the work of the TLZ R&D project teams.

TLZ practitioners also universally stress the importance of technical support for sharing work at all stages of its production, including a range of digital communication software applications which make up the organisational intranet, and which allow for different levels of formality and openness (see for example, Baptista 2009), and long-established organisational procedures and formats for various types of 'writing up'. One of these formats is known as 'technotes', which are moderately formal documents published within the organisation, and which may become the basis for externally published papers as well. Together with more informal notes and 'tickets' shared as part of team-working procedure, and the contents of even rougher notes typically kept in notebooks by individual practitioners, these 'technotes' constitute 'artefacts' (Brown and Duguid 1991, Engeström 2008, Hoyles et al 2010) which are the potential and actual foci of collaborative innovation. Furthermore, the intranet itself, from an emergent paradigm perspective, is more than merely a technical facility:

> '[intranet]technology is not inherently collaborative and the sharing of information will only occur if the culture of the organisation promotes and supports such behaviour. Intranets should therefore be conceived, instead, as inherently social and embedded in the social fabric of their hosting organisations.' (Baptista 2009, p306)

These contrasting potentials of technology are therefore another example of 'entanglement'.

4.3.2 'Recontextualisation' and boundary-crossing

The data suggest that TLZ practitioners make regular and purposeful use of resources, materials, expertise, ideas, not just from neighbouring, contiguous domains of practice, but on occasion from quite different or unrelated domains, on the grounds that this creates the possibility of benefitting from unforeseen, unexpected, or even entirely unexpected ideas:

> '*a lot of what we are doing is all about learning about something in area A, learning about something in area B, and then combining that knowledge in a novel and innovative way.*' (BR#1, 117-119)

The process through which TLZ practitioners synthesise knowledge and expertise from 'area A' with new ideas from 'area B' (or from their own knowledge, both tacit and explicit, with the knowledge of others), is a process of learning, and may produce new knowledge, or ideas for improving the work process, or for improving the tools used as part of it. This process of learning is what Guile (2010) defines as 'recontextualisation', which will be discussed further in the next chapter. TLZ practitioners understand clearly the value of opportunities for informal exchanges which enable and facilitate this process of recontextualisation, which is itself essential for the effectiveness of their work:

> '*we started off with an example of a formal kind of, semi-formal thing we do in our team meetings when we exchange information, but actually these informal opportunities for, you know, serendipitous exchanges really, are extremely powerful, and every good academic research group has got its coffee room.*' (TLZ Focus group #1 164-168)

Here we see highlighted the importance ascribed by the TLZ engineers to *contingency* as part of this process (as indicated by the word 'serendipitous'). This will also be elaborated in the next chapter.

In relation to the value of interaction across boundaries of expertise and of organisational structures, the TLZ practitioners identify themselves as having similar needs to those of academic researchers:

> '*academics are famously chatty….that's why email emerged from academic places, and then you have your informal opportunities. I had an example last year where I just happened to*

bump into a colleague on the stairs one day and a three minute conversation became a ten minute conversation that became a half hour meeting that became a project.' (TLZ Focus group #1 172-176)

This account also indicates the high level of discretion afforded to the TLZ researchers in terms of the organisation of their time, the detailed content of their work, and their modes of team-working.

This most significant area of difference between the two organisations suggested by the data is the theme of crossing boundaries. WBC practitioners see their work as being defined more than for TLZ practitioners by their vocational specialism: changes and developments in the subject over time are seen as evolutionary and not as a challenge to the practitioners' expertise – in general, these merely reflect evolutionary developments in the industry. The WBC practitioners take pride in their ability to adapt, often very quickly, not just to these industry changes, and the consequent developments and adaptations to the curriculum within their subject, but also to technical changes, usually emanating from the government, both to the organisation of the curriculum and the way it is assessed, and also to the resourcing of their work, and to the quality assurance regimes applied to it. They see their expertise as being self-contained and tend not to look outside their communities of practice for ideas or feedback (see the discussion about peer-review below). Because they can perceive that they can achieve the goals of their practice without so doing, and haven't in general got the time for 'boundary crossing' in any form – if it is thought about at all, it is seen as something that might be interesting but would be unlikely to be sufficiently productive to make it worthwhile, given the various short-term pressures all the practitioners are subject to.

While WBC practitioners are aware of changes in their work over time, they see these as typically gradual, driven primarily by their industry, based in commercial and technological

developments. They have trust in their organisation to manage its resources effectively, and to come up with effective medium and long-term strategies to cushion their work against the effects of more dramatic changes, or to prepare for them gradually, while continuing to support the local and regional industries which they are serving, and to which many of them are closely and professionally connected.

For TLZ R&D practitioners, in contrast, the data shows clearly that all the practitioners see 'boundary crossing' in various forms as essential to their practice: they believe that they are less likely to achieve their goals without it., and supported and encouraged by their organisation:

> *'A lot of the work that we, particularly in our team do, is to do with integrating work, and we build on the shoulders of giants - there's people all around the world working on this stuff, and there's no way you can be innovative in isolation, it's all about collaboration.'* (TLZ Focus group #1 120-124)

This represents an outward looking, enquiry-based orientation to the exercise of expertise, deliberately seeking surprises and disruption; whereas the WBC orientation is towards protecting and defending the core expertise held by the immediate team – developing it reactively and responsively, rather than proactively, speculatively and experimentally. In relation to Guile's concept of 'recontextualisation' (Guile 2014), the TLZ practitioners are looking outwards and crossing disciplinary and organisational boundaries in order to find stimuli for the learning and knowledge creation bound up with recontextualisation. This impulse can at times be in tension with the need for commercial sensitivity, for example in relation to the way project wikis are used:

> *'we open it up to people we are collaborating with, for example other members of our section, I just opened it up today to some guys across the road who we're collaborating with*

on a project…. most wikis are open…but because there's some stuff that's commercially sensitive, and patent pending things, that we don't want disseminated, we keep it to a closed group, and when we collaborate with people we open it up to those people.'

(TLZFG#1 189-208)

Bill, the TLZ team leader, shows here how potentially anyone can in principle be seen as a collaborator, though on occasion access to the project's ideas has to be restricted. He goes on:

'It's like a kind of pool of ripples or back splashes….as you are going through that experimental process you might think oh actually I need to do something slightly different, or change my method, or results collection, or repeat the experiment, different starting conditions, or whatever it happens to be….recently we took our kit into [BT's] lab and they have….lab conditions there that are different from lab conditions that we have, and by just taking it into that different milieu…You kind of think actually what I really need to do is work on this little, this little thing that we don't experience in our environment, and it's a slightly different take on things, and it just gives you a broader perspective on the world I think.'

(TLZFG #1 289-302)

WBC practitioners, on the other hand, see their work as characterised by the broadly repetitive exercise of their (mostly static) knowledge and practice. Supported by their organisation, they see their expertise as the carrying out of standardised procedures informed by a slowly evolving, but for the most part, effectively static knowledge base; whereas TLZ practitioners' approach, also supported by their organisation, allows and encourages them continually to recreate both their knowledge base and their team-working procedures, a process that has been described as 'Remaking one's job' (Price et al 2009, Ellstrom 2010).

4.3.3 TLZ R&D as an expansive organisation: organisational leadership and 'reification'

The TLZ practitioners see TLZ as having a strongly expansive orientation, reflected in the environment and organisational culture provided for their work and in the way work processes are organised. The data highlight discretion given to teams by the organisation in determining the direction of their work, and on the organisation's encouragement and support for expansive team leadership. 'Expansive' in this context, and the strength and consistency of the data, suggests not only that TLZ exhibits key indicators from Fuller and Unwin's (2004) Expansive-Restrictive Continuum (at the expansive end of the spectrum) in its strategic orientation, in the environment it provides for its practitioners, and in its approach to the organisation of their work, but that it is purposeful in doing so. As we saw in chapter 2, the Expansive-Restrictive Continuum reflects three major propositions: firstly, that learning at work is a function of participation in workplace processes and activities, and is associated with opportunities for practitioners to gain experience of 'going beyond' familiar roles and tasks. Secondly, it implies that organisations can support practice, learning and innovation through 'reification': through explicit codification of knowledge, procedures and policies, for example, and through supporting employees to gain relevant formal qualifications. Thirdly, it argues that organisations should explicitly value learning and development of all their employees, and that this should be a formal responsibility of line-managers and team leaders. TLZ strongly reflects all three of these clusters of indicators from the E-R Continuum: this is also borne out by the longevity and continuing high performance of TLZ R&D, in spite of epochal changes and transitions in engineering technology during its lifetime (for example, the change from analogue to digital broadcast technology), which might have been expected to require transformative changes in the organisation in order to manage these changes successfully, or

indeed even to survive; in fact TLZ's approach to the work of its teams has in many ways remained largely unchanged over the last 30 years and through the advent of digital technology (Derrick 2014).

At first sight there seem to be fewer dimensions of formality and reification in the TLZ R&D workplace than in many others, and this is an indicator of the high level of discretion afforded to practitioners, who see this in general not as a privilege but an essential component of an effective working environment:

> '*Tacit knowledge…how teams get to know each other and…self-organise in a way so that when a challenge or task comes up they are able to arrange themselves into a solution….rather than having to be heavily structured and told how to do that….the team leader role becomes more about managing it….*' (TLZ Focus group #2 556-563)

However, the data also suggest that formal aspects of the workplace environment are important for innovative working too. Examples of this evidenced in the data include first that formal training programmes are incorporated into project team-working whenever these are agreed by the team to be needed – these might be externally-provided, or involve an external specialist being brought in to lead the programme; secondly, the emphasis on 'writing up' as a standard element of team-working procedure, which, as we shall see in the next section, is not only an essential stage in the production of innovation, but also aims to ensure that knowledge is not lost if a team member leaves the organisation for any reason. Of course, these processes of enabling knowledge to be shared or passed on can never be complete: reification of workplace knowledge may be highly developed, but can never capture everything. There appeared to be relatively few other explicit procedural aspects of work in TLZ R&D that teams are not empowered to amend if they judge it to be necessary – this is the main way in which discretion operates in the TLZ R&D workplace.

However, it was interesting that TLZ practitioners recognise that elements of formality in project work, including procedures, deadlines, even production targets (usually set by the dates of external events such as conferences, exhibitions or seminars rather by the TLZ management), were materially useful in the innovative process:

> '*I think that having deadlines helps focus the mind in things, and I mean these, in a research and development environment it's quite often, there's a danger that you are just doing stuff and if you don't have a particular goal in mind then you can just wander off into being lost….by setting artificial deadlines in a way, self-imposed deadlines, it just allows us to corral our efforts, and focus on particular things….I've been involved in projects where we say OK we are going to set out our stall on subject X at IBC in September, and this might be in February time, and then we need to have demo up and running and packed away in a flight case, ready for the van to take it to Amsterdam by X date in September. That's very helpful.*' (BR#2 686-703)

TLZ practitioners recognise the positive value of constraints in the form, for example, of deadlines, procedural norms, or targets, and this is another example of conceptually opposite features of practice – in this case 'freedom from constraint' and 'subject to formal procedures, deadlines and targets' – which are both in fact potentially positive aspects of the workplace environment and culture, as long as practitioners have sufficient autonomy to be able to manage their entanglement: this supposition will be discussed more fully in the next chapter.

The data suggest strongly that leadership in the Beck's sense (1994) is highly diffused in TLZ R&D, though this is not to say that there is no hierarchy: as with WBC, this is seen as reflecting an appropriate division of labour, because although managers engage in different activities, they are seen as more or less always acting in support of the specialist practitioners in their work. In recent

years there have been debates within and outside the organisation about its values and purpose, debates which are reflected within TLZ R&D in open discussions about broad strategic priorities for their work (for example, about whether to continue to focus on terrestrial broadcasting, or to switch entirely to web-based operations). The outcomes of these internal and external debates may lead to changes in the style of leadership and management in the organisation, towards a more managerialist and hierarchical style for example, but there was little evidence of changes of this nature in the data.

4.3.4 Colleagues as 'peer reviewers'

For TLZ R&D practitioners, as we have seen in the earlier discussion about crossing boundaries, peer review, informal and formal, is a central and explicit element of work procedures and of the work culture. It expresses a number of key features of the TLZ R&D workplace: its relatively unhierarchical collectivity – the strength of the idea of a community of practice, collective expertise, commitment to sharing knowledge and ideas, and to a work process which is highly reflexive, which is to say that continual peer review is at its core. This characteristic is one of the justifications for the statement that TLZ R&D has similarities to a university lab, made by the leader of its Induction Programme in an earlier study (Derrick 2014). It is further evidence of the way the TLZ work environment and culture are oriented and organised to support enquiry: practitioners have both time and opportunity for peer review activities in a range of forms, both formal and informal, and clearly see this kind of collective responsibility within teams for the work of every member as part of ensuring that their work is as effective and productive as possible. This view extends beyond the team, as we saw in the last section, and the concept of 'peer' is in practice and in principle very wide: it can include new and

inexperienced colleagues, colleagues with different specialist knowledge and/or working in different teams, and where appropriate, it includes people working in other departments and organisations within what is ultimately a global community of practice. An implication of this broad definition of 'peer' is that practitioners need to exercise judgement in terms of (a) at what stage in the work process to seek peer review feedback (b) who might be asked for peer review or feedback and (c) how to assess the value of the review feedback received. Procedures may or may not be developed to formalise these decisions: in practice practitioners seem to operate both formally and informally. This suggests that here we have another example of entanglement, in which practitioners are, for better or worse, exercising autonomous judgements rather than operating any kind of standardised procedure – these data are evidence of the operating assumption among TLZ R&D practitioners and in the organisation itself, that such a technocratic approach to peer review of enquiry-based projects would be contradictory and self-defeating.

This theme was far more significant for TLZ practitioners than for those at WBC. This doesn't necessarily suggest that colleagues and team members don't check each other's work in WBC, or that second opinions are never asked for. Rather they are evidence that the idea of review of work by colleagues, informally or formally as part of the process of carrying out the work, as opposed to managerial review, as an element of formal quality assurance processes, is not at the forefront of WBC practitioners' experience. This may be because they see their work as largely technical – as a matter of operating of standardised procedures; or it may be that peer review is seen to take too much time, or because it is felt that the return on the effort involved is not likely to be sufficient; it may be either or both of these. Formal review processes with senior management, or as part of Staff Development Days, for example, focus on the need to adapt to changes in the compliance frameworks: outside these parameters, peer review in any form, formal or informal, is

not a salient or explicit aspect of work processes at WBC. What is clear from the data is that reviewing work is not in general seen as part of WBC practitioners' formal roles, rather, this is seen as a management responsibility.

4.3.5 'Writing up'

The third salient area in which the data for WBC and TLZ are differentiated is that concerned with the emphasis on 'writing up' of work. For TLZ, this focus has a number of interrelated functions, the first of which is that practice-based learning and innovation depends on existing knowledge, and this requires that, as far as possible, new knowledge generated by project teams needs to be made available and accessible for future use. In practical terms this produces an explicit emphasis at the heart of practice on 'writing up': '*to enable the knowledge to become part of organisational DNA….this is the way an organisation builds its expertise*', as a TLZ R&D practitioner said in an earlier study:

> '*The learning is as much from what other people in the same organisation have written before, you're standing on their shoulders. That's why 'writing up' is so important. It's part of building that co-operative, collaborative culture, writing up all the time.*' (KI interview, p4: Derrick 2014)

The second function of writing up, exemplifying a constructivist and social theory of learning through practice, is that reflecting and writing about the form and content of work, however informally, increases the effectiveness and utility of professional learning. This 'reflective practice' is often assumed to be limited to internally-directed thinking, but is arguably of greater use if it is taken beyond individual cerebration and extended into externally-oriented speaking and discussion

with colleagues, and greater still if thinking and conversations are formalised in some form of appropriate representation which can be shared over time and space. Such representations, which in diverse formats are ubiquitous features of the informal and formal practices of the TLZ practitioners, can be seen as examples of 'boundary objects' in the sense theorised by Akkerman and Bakker (2011) with the potential to enable communication and the sharing of insights or hypotheses between practitioners, teams or organisations, and to act as launchpads for further development of both theory and practice. The disciplined and imaginative effort involved in crystallising observations, ideas, questions, hypotheses, etc in sufficiently fixed form to be written down is itself a learning practice, but the writing produced can also act as an 'artefact': a working draft the improvement of which can be the focus of the next stage of collaborative work. ('Writing' in this context might in principle include any mode of representation appropriate to the context: visual, musical or embodied). In this conception, reflective practice can be seen as centrally important to the process of professional learning, and also to innovativeness, for both individuals and groups. I will have more to say about this link between the activity theory focus on 'artefacts' as the focus of projects and of collaborative team-working, in effect the substrate of learning and innovation, and theories of reflective practice, in more detail in the next chapter, in which we will synthesise all the findings enumerated in this chapter, and explore their implications.

4.3.6 Summary of findings from TLZ R&D

We have seen in this section that key features of the data from TLZ R&D include the purposeful encouragement and enabling of productive informal and social modes of interaction throughout and beyond the organisation; the understanding, apparently throughout the organisation, of the productive value of 'crossing boundaries' of all kinds, and the expansiveness of

the organisation in Fuller and Unwin's terms (2004). Like the WBC practitioners, TLZ staff value the central role played by informal and social interactions in their work; not just because these are more congenial, but because they are essential for successful outcomes in their work. Key differences between the two organisations are that this view is articulated clearly and emphatically by everyone in TLZ R&D, and that its organisational structures and cultures act purposefully in such a way as to enable and encourage these interactions.

The theme of 'crossing boundaries' as a key element of innovative working practices is very strongly marked in TLZ R&D. TLZ practitioners routinely bring into their work informal consultations with close and distant colleagues, and more than this, are attentive to the possibility of encountering useful and productive ideas in completely different contexts, including those outside of work. These potentials are formally encouraged by the organisation in the way it provides facilities and opportunities for unstructured informal interactions between different project teams, the autonomy afforded to teams in planning and carrying out their work, and in its fostering of an intensively enquiry-based culture of practice.

'Reification', in Fuller and Unwin's (2004) terms, is another important feature of the TLZ R&D workplace, serving less to restrict the autonomy of practitioners than to provide constructive constraints and clear parameters which can act as 'launchpads' for innovative thinking and activity. This effect or 'affordance' (Billett 2001a) of reification is enabled and supported by an organisational and professional culture which (a) explicitly aims to foster innovativeness; (b) is not primarily concerned with compliance with externally-set requirements; but which also (c) is strongly focussed on production: which is to say, firstly, that TLZ R&D projects aim not just to produce theoretical constructs, but to enable the design, construction and marketing of new material products, be they apps or devices, for example. Secondly, these products are intended to

contribute to improvements of various kinds in the public sphere: this is a central and explicit commitment of the organisation's mission, to which TLZ R&D's practitioners are also clearly committed. In the terms of the 'productive systems' analysis of Felstead et al (2009), 'reification' is a central procedural tool operating within TLZ R7D's horizontal 'stages of production'.

Another key practice element of the practice of TLZ R&D's practitioners is the purposeful 'writing up' of work, not just for bureaucratic purposes as one of the final stages of a project, but in more informal ways throughout the progress of work. This habit is seen as essential for effective working: it helps individual practitioners to crystallise and externalise their thinking so that it can be reviewed; and it helps team members to share ideas, hypotheses and problems so they can be collectively reviewed and evaluated. 'Writing up' is seen as both a formal and informal tool for practice, learning and innovation, and is used to review not just progress towards the planned project goal, but the methodological strategy too: 'writing up' is in effect the key tool for the continual review and re-creation of the project team's work processes.

Chapter 4 as a whole has outlined, mostly in a descriptive manner, the salient features of the data collected in the study, first for WBC and then for TLZ R&D, as determined through the analytical methodology described in chapter 3. This has been structured through key themes emerging from the data for each organisation. Significant differences between the two organisations, where they occur in relation to these themes, have been highlighted throughout. The next chapter provides a synthesis and discussion of these findings, and begins to point towards the headline conclusions of the study.

Chapter 5 Discussion

5.1 Introduction

In this chapter, I look in more detail at the way the key ideas emerging from the data from both organisations illustrate different aspects of the linkages and distinctions between learning, innovation and practice, and the extent to which they support particular conceptions of these linkages. The chapter is structured around five themes which have emerged most clearly from the data: the informal dimension of practice; environments for learning and innovation (including approaches to leadership within the organisation); discretion, trust, autonomy and constraints; boundary-crossing, boundary 'artefacts' and 'recontextualisation'; and finally, peer-review and 'writing-up'. Following elaboration of each of these themes in this chapter, these discussions will be synthesised in the final chapter of the study, and crystallised into headline conclusions for the study as a whole.

Before elaborating the five themes identified above, I need to indicate more explicitly what innovations, and what kinds of innovatory activities, the four teams of practitioners were engaged in during the period of their participation in the study. This wasn't a straightforward case of simply listing the formal objectives of explicitly innovatory projects: rather, for teams in both organisations, it was a matter of asking them to indicate areas of work which they saw as innovative, either because they involve the production of new outcomes, or of new techniques, procedures or other modes of working.

At WBC, all three participating teams had over recent months separately embarked on the production of a digital repository of teaching resources and materials. This programme of work did not come about as a result of a formal requirement of senior managers, but was driven, as was

much of their work, by the continuing need to find ways to work more quickly, efficiently, and consistently. The Hair and Beauty team and the Humanities teams at WBC were also writing new courses and schemes of work, either as a response to customer demand, or because the relevant awarding body had instituted changed assessment procedures into their qualification, a case which illustrates my argument that innovation can be viewed as a relational and distributed aspect of workplace practice.

For the TLZ R&D team, the overall area of innovative work during the period of the study was internet distribution. Will described the team's work as follows:

> 'We have various projects that are either looking at the efficiency or we are looking at how best to profile the use of that particular protocol. So recent ones we've been looking at HTTP 2….and how efficient that is compared to our current technologies; me and Harry have currently been looking at using a Dash-like approach to media which allows end-users to get hold of the version of the video that they want. We've been looking at doing that over live streams over multicast, to make the distribution of that media a bit more efficient from our servers, so that rather than sending several million of the same packets out to everyone at the other end we can just send it out once and it gets distributed by the internet out to all the endpoints that it needs to get to.' (WD#1 19-29)

Another of the team's projects involved improving the efficiency of internet communication protocols:

> 'The best example is Pete's work on HTTP 2….on how efficient that is compared to the older protocols, and that information's got published to the community who are developing HTTP

2, and a lot of people are interested in this study, which was innovative, no-one had really thought of looking at this before.' (WD#1 249-254)

The TLZ R&D work is clearly focussing on 'innovation' in a manner different to that of the WBC teams, for whom innovation consists primarily of finding new ways to manage their work more effectively and efficiently in the context of externally-set targets and constraints.

The diverse examples of innovative work being carried out by the project teams in the two organisations are discussed and contrasted in terms of similarities and differences in the following sections of this chapter.

5.2 Learning, innovation and practice in WBC and TLZ R&D: discussion of key themes

5.2.1 The informal dimension of practice: the 'tacit pedagogy' of the workplace

This study focusses on the 'informal' dimensions of workplace practice that have hitherto been relatively invisible in the literature on workplace learning. This is partly because, as Jensen et al (2007) point out, these aspects of practice raise complex issues of resources and methodology which many researchers have preferred to avoid. But it is also, I argue here, because of difficulties in conceptualising practice comprehensively and as a whole: it is very difficult to avoid imposing conceptual models onto real contexts, in order to make sense of them, but which in fact, through what Wordsworth (1798) described as 'dissection', simplify, distort and in other ways misrepresent them. 'Tacit pedagogy' is proposed here as a useful concept for thinking about workplace practice

that aims to minimise this danger. Tacit pedagogy is conceived not merely as encompassing any 'informal' aspect of a context such as management culture, team-working behavioural norms, conceptions of professionalism and identity held by practitioners, or what Jensen et al (2007), discussed earlier in Chapter 2, refer to as 'Doing, Using and Interacting (DUI) modes of learning and innovation', etc. It also includes the formal dimensions of practice, those that can be more easily measured and evidenced, exemplified by Jensen et al's (2007) other category: the 'Science, Technology and Innovation' (STI) mode of knowledge and learning, which, although it may be more easily observed and measured, may nevertheless impact on practice in complex, inconsistent or even contradictory ways at different times and in different contexts. The word 'tacit' then, in the phrase 'tacit pedagogy', is used to capture those features of the workplace environment, both material and operational, which resist simplistic definition and description. 'Pedagogy' is used in this phrase to denote the impact these factors have on the potential of practice to support practitioner learning and organisational development – that is, to support innovation. The concept of 'tacit pedagogy' therefore allows for the recognition that within authentic practice, the formal and the informal are not essentially separable, but in fact largely entangled: in this view, practice is the management of this entanglement, within contexts which are themselves constantly shifting. Pickering, as we have already noted, in his discussion of his related term 'mangle', puts it like this:

> '*the contours of material and social agency are mangled in practice, meaning emergently transformed and delineated in the dialectic of resistance and accommodation.*' {Pickering 1995, p23)

What the data from both WBC and TLZ suggest is that in each very different context, expert practitioners in both organisations manage the varied challenges presented to them differently on different occasions: now by exercising autonomy, now by conforming to rules and procedures; now

by formalising and sharing their thinking, now by proceeding on the basis of an intuitive hunch and on their own; now by hypothesising, now by trying things out to see what will happen; now by planning ahead, now by improvising. This flexibility is echoed in Pickering's discussion too (1995): he describes the work of scientists as the 'dance of agency', in which practitioners continually choose between tentatively acting on the basis of provisional ideas and then 'seeing what happens' in a more passive mode, in an iterative process he compares with 'tuning'. Practitioners' expertise, then, resides in this ability to select and utilise a range of contradictory and inconsistent strategies. Furthermore, as part of carrying out practice within their specific environment (and being developed by it, for better or worse), practitioners continually produce representations of it: most of these consist of unarticulated thoughts and are likely to be lost, but some are shared vocally with colleagues, a few may be expressed in written or other symbolic forms for sharing more widely, and fewer still may be formally published. Foregrounding 'tacit pedagogy' as a central conceptual feature of this analysis therefore (a) suggests that re-creation is a more accurate description of practice than repetition, and (b) provides a mechanism and an explanation for the emergence of innovation from everyday practice. In this respect, it is thus a development, as I aim to show later in this chapter, of both Fuller and Unwin's Expansive-Restrictive Continuum (2004) and Guile's (2014) concept of 'recontextualisation'.

Different contexts provide different kinds of support and constraint for practitioners in carrying out and being shaped by their practice. The themes identified in the last chapter offer us different perspectives on the freedoms and constraints experienced by the WBC and TLZ R&D practitioners, but they also illustrate how the same 'affordances' (Billett 2001a) of a workplace context can at times be experienced as supportive, and at other times as constraints: that is, they can both enable and inhibit learning and innovation. This is not to suggest that the contextual

factors (described for example in the 'productive systems' framework proposed by Felstead et al (2009)) are immaterial in descriptions and analysis of workplace practice, but that these factors do not determine predictably the different ways in which practitioners might experience their work, or carry it out. However, this study does suggest that contextual factors are highly material in affecting the ways in which practitioners are able to articulate and make use of representations of their practice, share and evaluate them with their colleagues, or use them as artefacts and templates for improvement and innovation, and this is one of the main differences observed between the two case studies.

TLZ R&D need their practitioners to produce and make use of representations in both formal and informal modes, as an embedded part of their practice, in order to achieve the organisation's primary goals. Their practitioners are afforded a high level of discretion at the level of teams and individual practitioners, teams plan and continually adapt their own work processes, they set their own deadlines, the time, space and equipment they need are in general made available, and an enquiry-based working culture based on a social model of work and learning, and on sharing ideas and hypotheses as widely as possible, is facilitated and strongly encouraged. The situation at WBC is different in a key respect: the dominant model of practice is that of fulfilling a set of standardised procedures, which does not in theory require the production of representations of those processes by practitioners, except in order to demonstrate their compliance with the expected standards. In short, teaching is seen by the organisation (and by the productive system within which it functions, as we shall see later in this chapter), as a process which can be legitimately standardised and reified, implying that it is not an activity requiring continual re-creation. Frequently in practice, however, the standardised processes do not produce the desired outcomes, in terms for example of student recruitment, or examination results: in these situations,

practitioners need to work together to find ways to achieve compliance by adapting standard procedures – for example by working over their hours, or by providing more tutorial support for particular students, or by digitising curriculum materials so as to save time. The 'tacit pedagogy' of this workplace, largely determined by the 'structures of production' within which WBC is located, is characterised both formally and informally by the need for compliance with external goals, and the availability of diminishing resources for doing so. The management of WBC allows their practitioners as much autonomy as it can, and tries to provide them with an enabling and professional working culture. In the 'tacit pedagogy' of the WBC workplace, however, the perceived need for standardised work processes means that practitioners are not encouraged or enabled to produce new representations of their work, as these are seen as unnecessary, and social types of informal professional learning mostly take place in practitioners' own time.

This section has proposed and elaborated the concept of 'tacit pedagogy' as helpful in understanding the ways in which learning and innovation can emerge from practice, and illustrated its utility using differences between WBC and TLZ R&D as suggested by the data. These differences are found primarily to be a function of the vertical dimension of the 'productive systems' (Felstead et al 2009) within which each organisation operates. We now go on to discuss TLZ and WBC's 'productive systems' in more detail.

5.2.2 Environments for learning and innovation: 'productive systems'

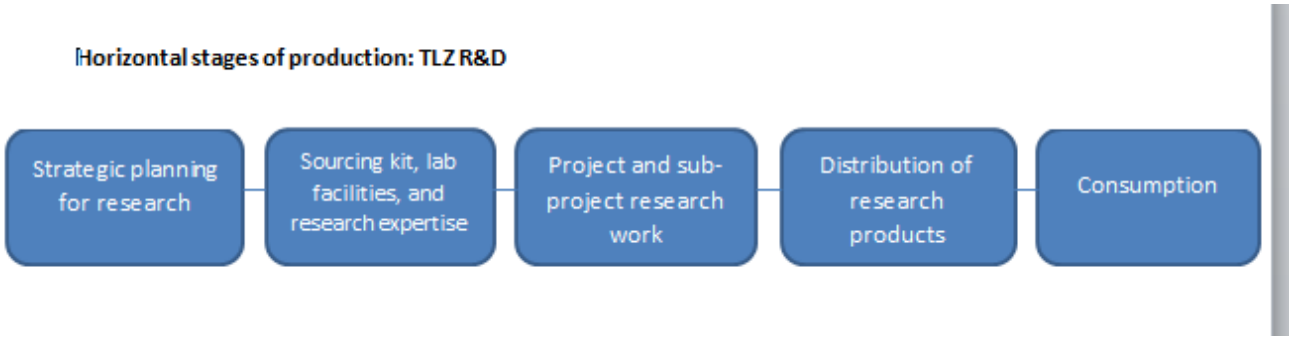
The findings of this study suggest that a wide range of contextual factors, in terms of both the organisation itself and the wider 'productive system' (Felstead et al (2009) in which it is located, are critical, in both enabling and inhibiting workplace learning and innovation. The comprehensive perspective of Felstead et al's analytical framework, incorporating both horizontal 'stages of

production' and vertical 'structures of production', is important for this study, because all aspects of context, whether formal or informal, macro or micro-level, contribute to the totality of the social and cultural situation; that is, are constituents of the 'tacit pedagogy' of a particular workplace. The 'productive systems' approach is explicitly concerned to provide a framework for identifying and understanding power relations operating within and between the different structures and stages, but Felstead and his colleagues, whose work is located firmly within the emergent paradigm, are careful to warn against over-determined interpretations of these relations:

> '*we conceive power relationships as a (usually unequal) balance of forces, rather than one-way pattern of subordination. We take it as axiomatic that power is not a 'thing' that is possessed by one party to a relationship and denied to another. Rather, power is a two-way attribute of social relationships. Power relations comprise a dynamic interchange between stronger and weaker parties, rather than a zero-sum game.*' (Felstead et al 2009, p31)

The complex and dynamic nature of two-way power relationships can therefore also be seen in practice as another example of the phenomenon of 'entanglement'. I now apply the 'Productive systems' analysis (Felstead et al 2009) to TLZ R&D and WBC.

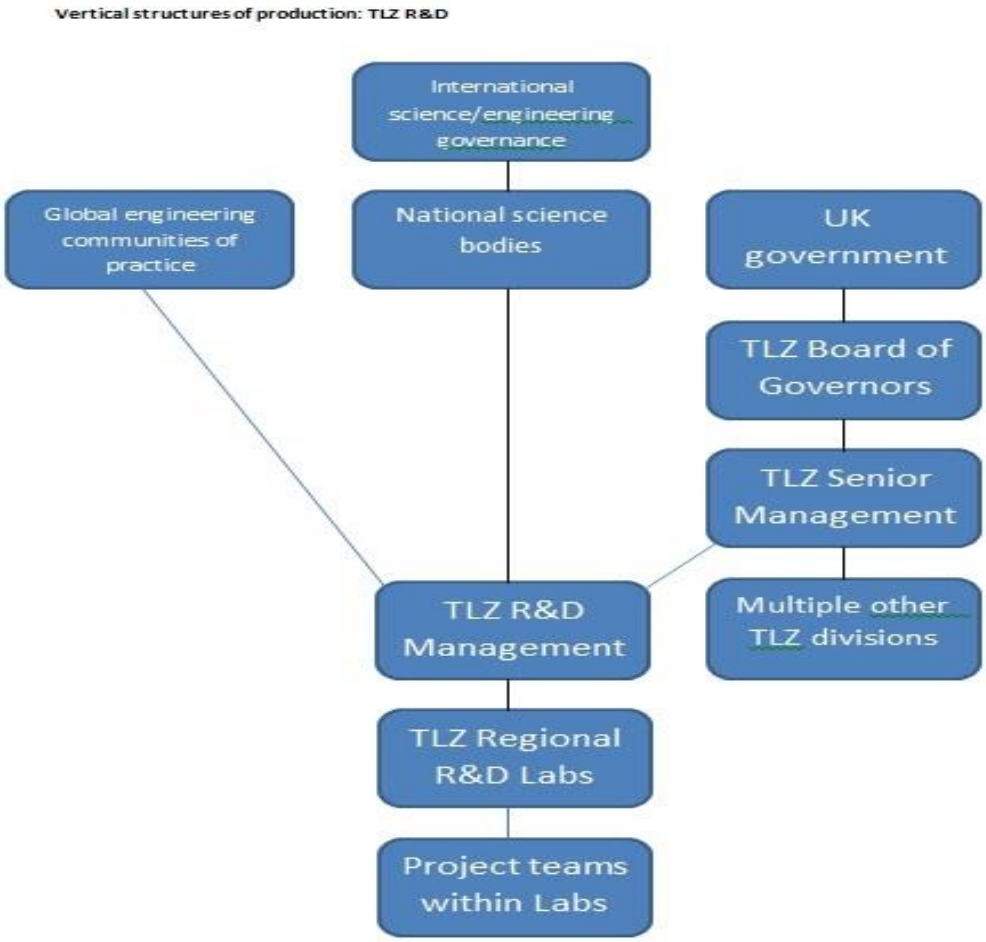
From the perspective of the horizontal 'stages of production' TLZ R&D is purposefully and explicitly concerned with technical research and innovation:



The first stage of production establishes a medium and long term strategic context for the detailed project work of the organisation, and the second ensures that hardware, facilities and specialist expertise is available to enact the strategic priorities set by the first stage. The estimates of what resources of each type are required, and how much, represent an element of uncertainty, and the extent to which margins for contingencies are built in is an issue depending on the financial and political constraints on the organisation, both of which are functions of the higher levels of the productive system. The third stage represents the actual work of the project teams, which are generally defined in terms of a technical problem of engineering which needs to be solved, or the design of a new or improved product, or both. The fourth stage involves marketing and distribution of the results of the project work, following which they are available for consumption by clients and end-users.

Every stage of this sequence provides scope for discussion about possible alternatives, in terms of both potential outcomes and the practicalities of achieving them. New ideas are not just desirable but required, and are actively sought from all members of the organisation. We have seen that representations of the content and processes of the work are constantly being crystallised, in varying degrees of formality. The generation of these is the reason why the workplace needs features such as: (a) unstructured space and time within work schedules to allow these representations to be developed; (b) a social, informal, collegiate and interactive culture; (c) an ethos of sharing rather than hoarding ideas; and finally (d) personal commitment to a public benefit ethos (other motivational drivers, such as, for example, financial bonuses or prizes, might encourage individual competitiveness and thereby inhibit the culture of knowledge-sharing knowledge essential for effective working).

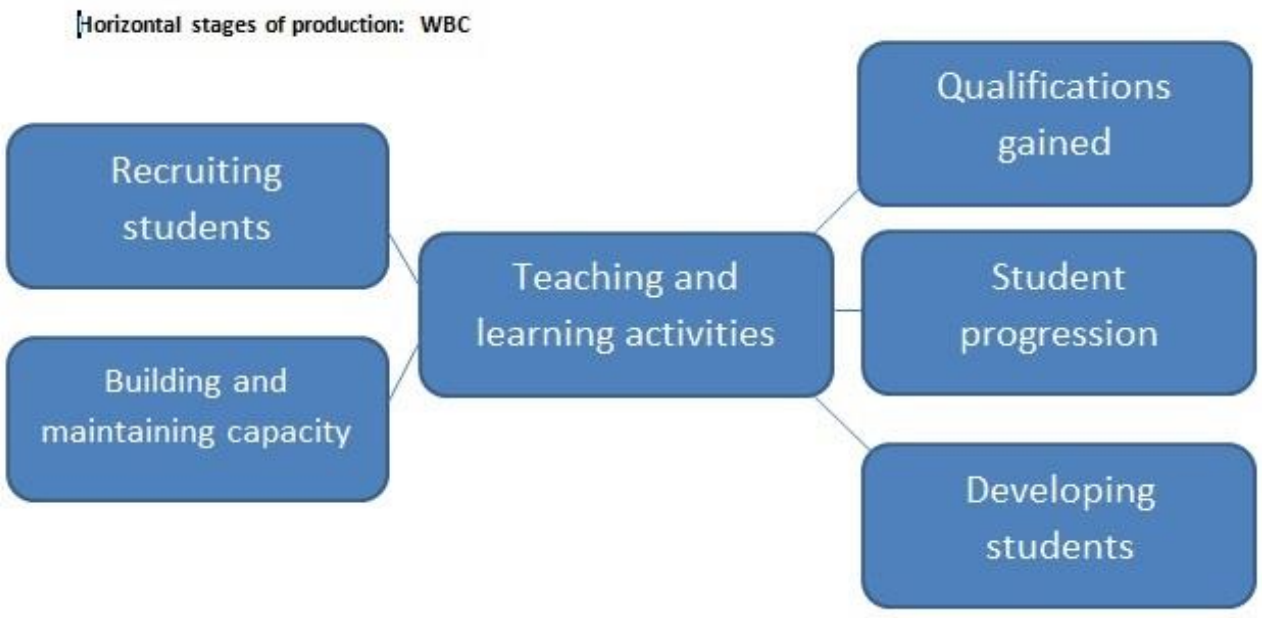
In terms of its vertical 'structures of production', TLZ R&D is to a high degree autonomous, freer than most of its nearest peers from the disciplines of the market, with a global reputation



for the quality of its work and its commitment to a public service ethos. Within TLZ as a whole, the R&D division is a small element, and its highly specialist engineering work is unique within the main activities of the organisation as a whole. At the same time, due to its global reputation over many years and its unique position as part of a publicly-funded broadcasting organisation, it plays an influential role in the contexts of national and global broadcasting infrastructure, policy and research development, and within the global science and engineering communities of practice. Its small size also means that R&D management are relatively close to the research teams in personal and social terms: the management structure is flat rather than strongly hierarchical, and its culture

is collegiate and social. Thus TLZ R&D effectively exercises a high level of autonomy within the larger TLZ, and research team leaders and practitioners within R&D are also highly autonomous within the R&D division itself. Innovation as a formal objective of the organisation demands a degree of autonomy within research teams: planned innovation is essentially a contradiction in terms (Burns and Stalker 1961, Galbraith 1982, Morgan 1997).

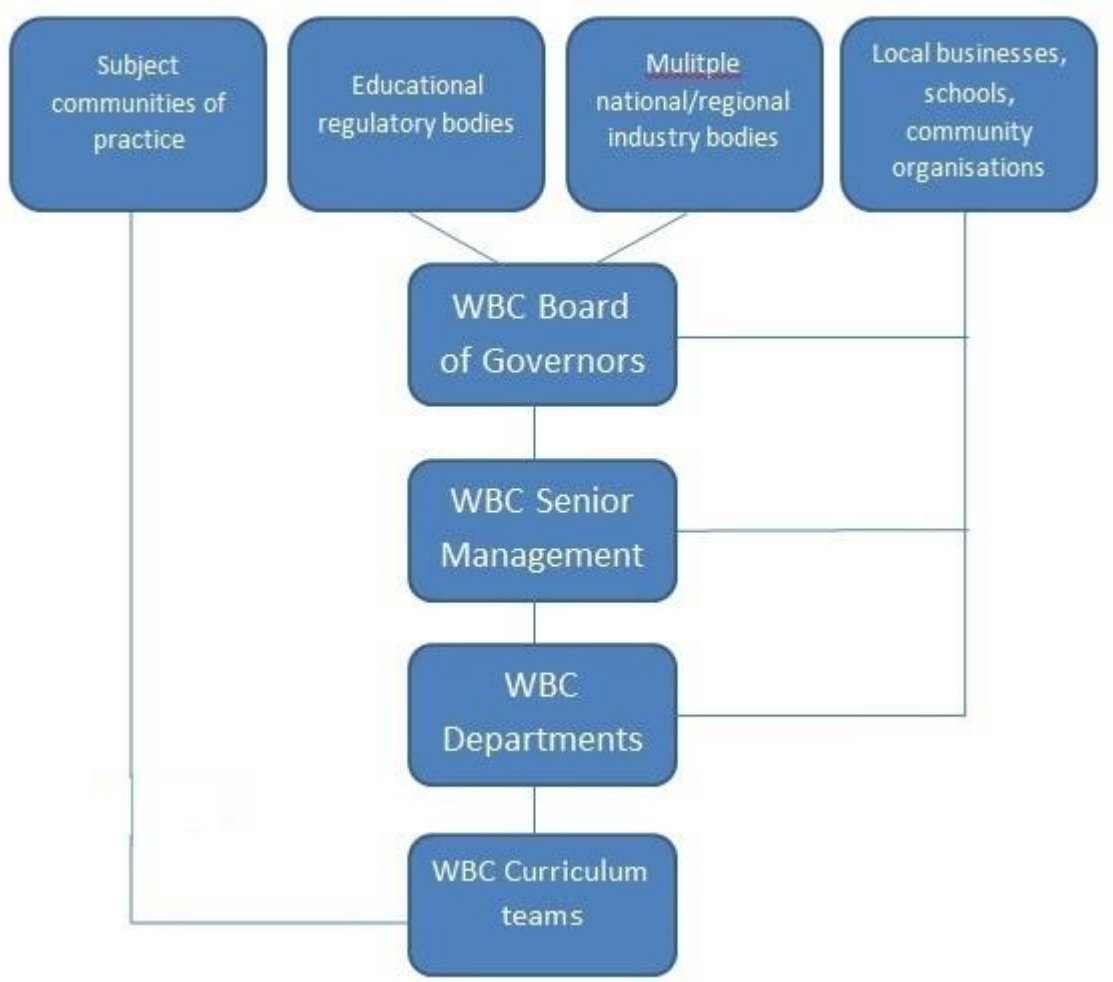
WBC primarily sees its business in terms of the provision of relatively standardised academic and vocational training programmes. These vary by subject or occupational sector, but all involve a combination of the elements of recruiting new students, initial assessment, a formal curriculum determined by a national government or industry agency, classroom teaching and learning, tutorial support, extracurricular activities



perhaps including work-placements, advice about suitable progression routes into employment, university, or higher level training, final summative assessment, and the award of a national qualification. The chart above is a simplified view of WBC's horizontal 'stages of production': the way government funding is allocated to colleges, as well as the normative expectations of the

inspection system, means that there is limited scope for varying the elements or the overall shape of this production process. Rather, in the context of fixed or diminishing resources, alternative ideas and models are valuable only if they help in achieving objectives more effectively, quickly or cheaply: if not they are likely to be seen as a potentially damaging distraction. This analysis is reinforced when we consider WBC's vertical 'structures of production':

Vertical 'structures of production': WBC



The key feature of the vertical 'structures of production' applying to WBC is the central chain of influence, leading up to government funding and regulatory agencies, and to industry awarding bodies. The government agencies preside over a complex system of tariffs through which the

college is largely funded, and a quality assurance regime in which organisational performance is benchmarked and closely monitored at a national level. These two oversight systems are linked, as a proportion of funding is outcome-determined, and measurable outputs in the form of qualifications gained is the key performance indicator of quality. The other two vertical chains through which the college at different levels is influenced are (a) the communities of practice of the various subject teachers, which depending on the subject, are more or less institutionalised, and (b) other local and regional organisations with links to the college, through contracts and partnerships, progression links to and from other educational providers including schools and universities, or to employers with whom college students can progress into employment, and other local and regional organisations such as the local authorities whose areas are served by the college. These two chains of influence, by comparison with the central one through which to a large degree the college's activities are circumscribed, are weak, as they play a very small role in relation to regulation, quality assurance, and funding.

As a consequence of these vertical structures of production, the scope and opportunity for autonomous creation of alternative representations of work processes by practitioners or even senior managers in WBC, let alone the possibility of implementing them, is radically limited. As a result, WBC is strongly focussed on 'single-loop thinking' – managing their existing successful production processes as efficiently as possible: 'double-loop thinking' is neither encouraged in organisational culture nor facilitated in practice (Argyris 1977, Argyris and Schön 1978). The practical influence of the different vertical chains of the 'productive system' is reversed for TLZ R&D: 'double-loop' thinking is deeply embedded in its work processes and 'tacit pedagogy ', and this contrast accounts for the major differences between the two case studies (Argyris 1977, Argyris and Schön 1978).

In spite of these limitations, WBC does afford its specialist practitioner teams a sense of autonomy within the immediate scope of their work: teams propose their own outcome targets and once approved, are largely autonomous in pursuing them, and, due to the management's skills and success in managing the college finances, they can sometimes respond positively to bids for funding for new equipment or for staff training. WBC's staff understand that the college has limited scope for experimentation, creativity or even for incremental development, and they know their expertise is recognised by the autonomy, trust and discretion they are afforded within the constraints of the productive system.

Thus we can see that the extent to which the culture of leadership and authority is expressed hierarchically, or alternatively is distributed within organisations, is a key aspect of the way its productive system is manifested as an element of the context for practitioners. Leadership, as an aspect of the environmental context for practice, is distributed to a greater degree within TLZ R&D than within WBC. It takes a more marked hierarchical form in WBC, although senior management have been successful in delegating leadership, within their formally-defined domains of work, to curriculum team leaders, who have also developed a strongly collegiate and collective style of team leadership, focussed strongly on the quality of the work and on the production of public benefit: that is, on productive outcomes for students. Personal team leadership in WBC is very similar in style and procedures to that found in TLZ, and which, as in TLZ, expresses a clear recognition of the professional expertise of all team members. However, this manner of team-working requires significant time for formal and informal communication within the team, of which there is much less in the WBC context.

We have seen in this section how different features of the productive systems (Felstead et al 2009) of the two organisations provide a mechanism for explaining differences in the work

processes of the two groups of practitioners: for the TLZ engineers, continually taking time to make representations of all aspects of their work, for both formal and informal purposes, is a routine stock-in-trade of their work, whereas for WBC teachers and curriculum managers this happens much more rarely and generally only at an individual and informal level, because for the most part, the making of such representations is seen as a redundant activity, unhelpful in terms of compliance with externally determined regimes of funding and quality. This is a crucial difference in terms of learning and innovation, for both of which these representations are a key currency.

5.2.3 Discretion, trust, autonomy and constraints

> '*Trust bridges the gap between the known and the unknown, the predictable and the unpredictable. Where everything is certain, trust is irrelevant'*. (Felstead et al 2009, pp24-25).

The concepts of trust and discretion, in relation to organisational work cultures, bespeak the tacit aspects of practice, referring implicitly both to consensual but informal practices and processes, but also to what Brown and Duguid (1991) refer to as 'non-canonical' or unofficial elements of workplace practice. The discretion that is afforded to practitioners within each organisation allows them to feel that their expertise is valued and appreciated by their organisation, and that they are trusted by it. They may also feel that being afforded appropriate discretion by their organisation, rather than being 'micro-managed' or being required to work within a non-negotiable and tightly-specified set of procedures, is more likely to produce the kinds of outcomes desired by themselves and by the organisation, because 'they know best' - both groups of practitioners in this study demonstrated high levels of professional confidence in their expertise.

A key difference between the two case studies is the nature of the autonomy within their work experienced by both sets of staff, and the manner in which this autonomy is constrained. In effect, there are recognised formal constraints to practitioner autonomy, defined in formal regulations mostly set externally and at the higher end of the 'structures of production' (Felstead et al 2009). Teams and practitioners are afforded significant discretion by and within each organisation, but the bounds of this discretion contrast sharply between the two organisations. These bounds are clearly understood and largely accepted as legitimate in relation to day to day working arrangements, by both groups of practitioners, either as appropriate (junior staff may not want to accept high levels of responsibility for project outcomes, for example), or as effectively non-negotiable within the workplace (because set by external regulatory bodies).

Typically, in any context, constraints to practitioner autonomy can take a number of forms: limits in terms of time and resources, procedural requirements and prohibitions, conventional knowledge boundaries set by specific domains of practice or curriculum, and the norms and expectations of social and cultural behaviour (which may well not be particularly explicit). For both sets of practitioners, procedural constraints are not generally perceived as problematic: for WBC, they are seen as either outside their organisation's effective control, or, if determined by their senior management, reasonable. For TLZ practitioners, procedural requirements are generally embedded in work processes which are part of the long traditions of the organisation, and are seen if anything as supporting the work rather than limiting the practitioners' scope for action: I will return to this point. Both sets of practitioners recognise that there are always limits to available resources. These limits impact more directly on WBC practitioners than on their TLZ counterparts, who generally are able to get any reasonable resources they feel are needed. WBC teachers do not always get what they feel is needed, and do not always agree with the resource priorities of the

college, though in general they recognise that all colleges like theirs have been experiencing cuts in government funding over a long period, and that these are outside the control of their managers. WBC staff, in fact, display a high level of confidence in the strategic decision-making of the college management, and particularly in their financial management: this trust is based on its successful performance, both financial and political, over time; and it is strikingly clear that this is not just an affective position, but based on evidence and comparisons with other workplaces:

> '(SJ): *If things were falling apart, financially and so on, I think the goodwill that's required to get compliance perhaps wouldn't be so strong. ….being new to this college, I was quite struck with that compared to previous experience.'* (ST): *'I agree with that….you get that security, you are in safe hands, you know that the senior management team have a strategic plan….robust enough to take the college forward, I think that's what gives me confidence as an individual, whereas some of our competitors aren't, and I've certainly experienced that….whereas here you think yeah, they can foresee what we are up against and they'll put that plan in place and execute it correctly, from what I've seen so far anyway.*' (UXFG#2 762-801)

Constraints on the autonomy of practitioners can obviously be seen as the opposite of trust and discretion, and may also be a source of employee resistance, but these case studies indicate that this is not always true:

> *'having deadlines is very, very useful, because they can keep you on track, knowing I've only got a few weeks to do this.'* (SH#2 447-448)

Time constraints are typically, for TLZ teams, set by themselves in relation to project planning, or by external events, such as conferences, seminars or exhibitions, for which specific

projects might be expected to deliver a paper, or a prototype device or app. These are seen by the TLZ practitioners as being helpful foci around which to decide priorities and to act as production deadlines, and in that sense not just unproblematic in principle, but actually helpful to their objectives:

> *'The classic example for us is the annual trade show in Amsterdam….where we say OK we are going to set out our stall on subject X….in September, and this might be in February time, and then we need to have the demo up and running and packed away in a flight case, ready for the van to take it to Amsterdam by X date in September. And that's also very helpful.'* (RB#2 696-703)

Here we see simple and practical examples of the ways in which in certain circumstances, far from being inhibitors, constraints can be facilitators or even 'launch-pads' for productive and innovatory practice. This point will be elaborated in the next section on 'boundary crossing'.

5.2.4 Boundary-crossing, 'artefacts', 'recontextualisation' and contingency

We saw in the previous chapter that for TLZ, but much less sharply for WBC, the theme of 'crossing boundaries' is a key element of the practitioners' innovative working practices. Informal consultations with close and distant colleagues, and attention to the possibility of encountering useful and productive ideas in different contexts, including unexpected contexts outside of work, are a central feature of TLZ R&D practice, and are facilitated by their organisation in its formal procedures and policies, the physical and technical infrastructure within the working environment, and in the working and social culture it fosters. These boundaries are between teams or organisations, disciplinary boundaries of specialised or procedural knowledge, or boundaries of

'custom and practice'. This aspect of practice is closely associated with a number of different theoretical perspectives, the first of which is Schön's (1967) idea of 'concept displacement' in relation to innovation: his argument is that a key mode of innovation is the application of knowledge originating in one domain to another, perhaps completely unrelated domain, in a process in which boundaries are by definition crossed. Second is the notion of 'recontextualisation', introduced by Guile (2014) to help understand the processes involved when practitioners apply knowledge acquired in one context to another. The third concept associated with boundary-crossing is the idea of 'artefacts' used as the foci of collaborative innovation projects (Engeström 2008, Hoyles et al 2010, Akkerman and Bakker 2011); and finally, 'contingency' (see for example Collin 2002), as highlighted by Billy, the TLZ team leader quoted in the last chapter. Billy's use of the word 'serendipitous' in that quotation suggests (a) the central role of contingency in the TLZ practitioners' perspectives on their work and (b) the purposiveness with which individual practitioners, teams and the organisation as a whole, aim to create opportunities in which potentially valuable contingent knowledge and insights may become accessible. Contingency is an important concept here because it allows us to account for uncertainty, 'novelty' (Carlile 2004), risk, the possibility of significant innovation, and the inevitability of accidents, for both good and ill, as familiar elements of practice in every context (Collin 2002).

We have seen how practitioners in both organisations, to sharply varying degrees, make provisional representations of aspects of their work as part of their practice, and that these have the potential to be worked on purposefully and collaboratively within specific teams and across boundaries. These continually reworked representations are described as 'boundary objects' (Akkerman and Bakker 2011) or 'artefacts' (Hoyles et al 2010), and are the provisional objects and foci of collaborative practice which can act as work-in-progress towards the articulation and

development of new products, strategies and working processes (see also Engeström 2004 & 2008 and Edwards 2010). For TLZ R&D practitioners this is a much more central and strategic feature of their work than for the WBC teams, but the outlines of these potentials are found there too, as we saw in the different curriculum resource 'standardisation' projects of the three WBC teams. Engeström's concept of 'negotiated knotworking' (2004, referenced earlier in chapter 2) effectively expresses the informality and provisionality of much of this kind of practice, as well as the fact that very many occasions of it are not destined to be 'completed' in any formal way. But they have the potential, realised much more in TLZ R&D than in WBC, to be the occasion of three different kinds of valuable formal outcome, any of which may be embodied in the 'artefact' itself: these are firstly, explicit new knowledge (both theoretical and practical), secondly, improvements in the work process, both procedural or environmental, and finally in terms of practitioner learning. This is likely to include broadening understanding of different domains of practice, so as to be able to work across the relevant domain boundaries, involving, as we saw in chapter 2, the development of 'shared procedures' (Toulmin 1999). One example of this kind of practitioner learning would be the learning of new practitioners, particularly within the apprenticeship model of learning: in this case the boundary being crossed is that between the level and breadth of their expertise and that of the more experienced members of the team of which they are, at least provisionally, members. This account is a therefore a refinement of Lave and Wenger's concept of 'legitimate peripheral participation' (1991), but also takes account of Fuller et al's critical point (2005) that the direction of learning may not be just one way, as Lave and Wenger seemed to imply: the new practitioner is not simply a passive receiver of knowledge from the 'old timers', but may also have insights to contribute, based on the contingent knowledge and experience they bring.

This account of processes observable to different degrees in TLZ R&D and in WBC aligns well with Guile's account of his concept of 'recontextualisation' (2014). He argues that recontextualisation has four dimensions: firstly, in each situation, the work of teams requires meaningful practical and intellectual decisions to be made; secondly, these decisions are continuously subjected to evaluation and judgement by teams themselves and their colleagues (decision-making); thirdly, these judgements are informed by shared ideas of appropriateness and the extent to which they will contribute to effective working (normative context); and finally, their decisions are generally not just 'academic' but have *practical* consequences – they make an observable difference to the social context and work processes. Furthermore, these judgements are based on entangled, embodied and intellectual knowledge, both tacit and explicit: they are based on inference as much as on formal deduction or induction, and they are almost always provisional, in the sense that they rarely lead to the comprehensive completion of a piece of work, or the complete 'solution' of a problem. The evidence from the study data is that the teams of practitioners in both organisations are highly effective within the different configurations of the working context they experience: the difference is that the WBC teams operate within a work context created (albeit inconsistently) by its productive system (Felstead et al 2009) as more 'mechanistic' than organic (Burns and Stalker 1961), thus working against the grain of practice as conceptualised in the emergent paradigm, reducing their opportunities and scope for generating employee-driven innovation (Høyrup et al 2012), and creating the perception of a mismatch between their values and those of 'the system'. The productive system of TLZ R&D, consciously or otherwise, effectively works much more markedly and consistently with the grain of effective and innovative practice, and few of the tensions and anxieties expressed by the WBC teachers were echoed to any degree by the TLZ engineers. This difference coupled with the WBC teachers' experience of steadily diminishing resources available to them in terms of time and funding for

their work, and ever-increasing expectations in terms of measurable outcomes, accounts for the experience of continuous pressure which is widespread among them, but largely absent in the data from TLZ R&D.

Furthermore, we see here again how the extent to which interactions between near or distant colleagues can be described as formal or informal is not the critical issue for the value of these interactions. Local definitions of 'formal' and 'informal' interactions, judgements, procedures and tools etc, might well exist, but such definitions are strictly unnecessary in terms of supporting the work process. In practice, again, we see that these qualities are 'entangled'.

5.2.5 Peer review and 'writing up'

In Chapter 4, I identified three main functions of 'writing up' which can be found in the data (in a much more pronounced manner within TLZ R&D than in WBC). These are, first, as the making explicit of new knowledge in Nonaka's (1996) sense: without writing up with the goal of making new knowledge explicit, new ideas are unavailable for sharing or implementation. Bessen (2015), for example, points out that, in order to spread and make an impact, new technologies need practitioners to be trained in their use, and that this does not happen until the knowledge involved can be expressed in the form of rubrics and training manuals. Secondly, 'writing up' supports professional learning, which involves reflection on practice, ideally in a collaborative context, which in turn requires the making, sharing, evaluating and improving of representations of practice. These representations may concern the content of practice, in the sense of what is trying to be achieved (the 'what'), or the work processes themselves (the 'how'), or indeed both entangled. Thirdly, as we saw in Chapter 4, these representations, as we have seen, have the potential to act

as ‘artefacts’ around which both learning and new knowledge can solidify, though this is never guaranteed.

We have seen in the findings from TLZ R&D that ‘peer review’ is closely related to ‘writing up’. For TLZ practitioners it involves the purposeful seeking and giving of informal and formal feedback, and both within the team and beyond it, within the wider organisational community (thereby perhaps crossing specialism boundaries), but also across institutional boundaries. The formal aspect of this function and process emphasises its importance both for effective working and for organisational reputation, in relation to the quality of TLZ R&D’s research processes. In this regard, TLZ R&D is similar to a university research department, and individual teams to lab teams. The representations of practice produced by the various types and levels of ‘writing up’ are the currency of peer review, which is a process through which these representations are critiqued and developed, through an interactive, collaborative and formative feedback process. For this process to be optimised it needs to be authentic, mission-focussed (Mazzucato (2017)) and goal-oriented (Milligan et al 2012): this is why the quality of the informal relationships between the participants are as important as their formal roles, and why ‘leadership’ in the sense articulated in emergent paradigm literature (for example Vaill 1996, Morgan 1997, Fuller and Unwin 2004, Beatty 2011) needs to be distributed as far as possible. This account of the peer review process once again exemplifies the way formal and informal dimensions of the process are both critical for it to realise its potential, and that these dimensions, jointly embodied in the quality and content of the personal interactions between practitioners, are inseparably entangled.

The findings strongly suggest that ‘writing up’ and peer review activities are minor rather than major features of the work of the WBC practitioners, whereas they are central to the everyday working practices and culture of TLZ R&D. The ‘productive systems’ framework once again helps

illuminate this: the difference between the scope for autonomous decision-making between practitioners in the two organisations in this study is analogous in some respects to the difference between the 'freestyle' and 'pre-choreography' categories of fitness instructor employment found in another study by Felstead and his colleagues. 'Pre-choreography' instructors are not required in any sense to conceptualise or evaluate the standardised programme they perform, whereas the 'freestyle' instructors create, implement, and evaluate representations of their own routines (Felstead et al 2007). Although WBC teachers do exercise a degree of autonomy in their work, it is strictly circumscribed: they have a certain amount of freedom as a team to decide on their strategy and tactics for achieving their organisational goals. However, they can hardly be said to set their own goals: they propose annual goals for their team, but these need to align closely with the strategic needs of the organisation, and in practice are usually expected to increase efficiency (throughput and/or resource management) and quality each year. Team discussions, both formal and informal, tend to focus on improvising ways to solve increasingly difficult logistical puzzles. Constructive and informed proposals to senior management from practitioners for investment intended to sidestep some of these problems through responding to opportunities in the market produced by technological changes, for example, have no guarantee of success. To WBC practitioners, even though they respect the financial skill of their senior management team, failures like this appear to be systemic, and have the effect of discouraging any activities that do not contribute directly to achieving the goals in place at that moment.

At the same time, of course, the increasing pressure on time and resources reduces formal opportunities for writing up and peer review activities which are not critical in the short term. Both organisation and practitioners supported the implementation of a new process through which teachers would engage in peer observations and feedback meetings, but the initiative withered as

people were not able in practice to give enough time to it. While WBC practitioners in general feel that their expertise and professionalism is respected and valued by the college senior management, they often feel that this is not true of the system within which the college works. In TLZ R&D, on the other hand, even if ideas from practitioners do not always succeed in gaining traction at the organisational level, this is not seen as a systemic problem, nor as a possible symptom of disregard for the practitioners' expertise. The organisation is seen as valuing the time practitioners need to pursue their writing up and peer review activities, and the productive system within which TLZ works does not prevent TLZ R&D from making available the time and resources needed.

In this chapter I have identified five major conceptual themes which have emerged from the findings, of which one, the positive significance of the informal and tacit pedagogy of the workplace is a feature common to both research sites, and four are present in both but to different degrees. These are: the different productive systems within which the two organisations operate; the extent of trust and scope for discretion enjoyed by the practitioners in each organisation; the presence of boundary-crossing activities; and the extent to which peer review and 'writing up' are embedded practices within the work of teams in each organisation. I have shown how these variations in practice and culture between the two sites can be largely accounted for by the differences in the vertical aspects of their respective 'production systems' (Felstead et al 2009). Furthermore, each theme has in different ways suggested refinements in approaches to conceptualising learning, innovation and practice within the emergent paradigm (Beckett and Hager 2002), exemplified by the two ideas of 'tacit pedagogy' and 'entanglement'. In the thesis's final chapter I synthesise these thematic discussions and crystallise them into overall conclusions from the study, both for practice and for theory.

Chapter 6 Conclusions

6.1 Introduction

I started this thesis by presenting its genesis in the context of my practice as a teacher educator and my development as a researcher. I reviewed a selection of relevant literature, described and justified the methodology used in the study, presented the data and discussed it analytically. In the main part of this final chapter, I crystallise the main findings and conclusions of the study, and suggest some of the implications of these findings for organisations and individual practitioners, under six sub-headings. This is followed by four short sections on the extent to which the study has answered its original research questions, its limitations, an assessment of its impact on my own practice and development as a researcher and teacher educator, and possible future directions for research that are suggested by it.

At the outset of this final chapter, I want to clarify succinctly what I believe to be the overall contribution of this study in academic, theoretical and conceptual terms, thereby indicating what insights it provides, that the existing literature does not. The study starts from a critical position that argues that accounts of learning from within the 'standard paradigm' (Beckett and Hager 2002) have not provided satisfactory socio-material accounts of the evolution of knowledge and practice through work; that is, they have not provided satisfactory accounts of practitioner-led innovation. I suggest that this is mainly because earlier work has not attended sufficiently to the informal and tacit dimensions of practice, which have remained under-theorised and under-researched. In the context of this judgement, the study offers (a) two contributions to the conceptual framework for understanding how learning and innovation can emerge from everyday practice, that take account

of the tacit and informal dimensions of work, and (b) three specific team-working practices, which, the study suggests, are likely to indicate innovatory practice and which are observable and therefore potentially useful as analytical tools for future research. The two conceptual contributions are 'tacit pedagogy' and 'entanglement', explained in more detail below in section 6.2.6. The three team-working practices, described in more detail in section 6.2.4 below, are (a) making representations of practice, or 'writing up'; (b) peer review of these representations; and (c) boundary-crossing and the use of boundary objects. These three types of practice are not necessarily entirely discrete or ordered formally, and crucially they are manifested in all degrees of informality and provisionality as well as in more formal modes. Previous studies and conceptions have mostly attended only to the formal modes of these practices, which are clearly more salient precisely because they are formal; however this study argues and aims firstly to demonstrate that the informal modes of these practices are an essential part of the process through which new ideas emerge, and secondly to elaborate some of the ways in which this process takes place within these teams, and within these two organisations.

Having stated the specific contributions I believe this study makes, I now outline its main conclusions in more detail.

6.2 Conclusions

In these headline conclusions I assume that workplace learning is in principle desirable, and that optimising innovation and the capacity to innovate are also desired objectives, for both practitioners and organisations, whether or not they see innovation as a primary work objective, or as a response to the dynamically-changing contexts within which they operate. This section

outlines conclusions from the study rather than makes detailed recommendations, though I hope they may also function as practical suggestions, or at least 'thought experiments' (Norton 1991), for organisations and individual practitioners about work environments on the one hand, and practitioner behaviours and dispositions on the other, in order to achieve these objectives, whatever the context in terms of the support or constraints associated with their 'system of production' (Felstead et al 2009). The final part of this section focusses on the connections between the study's two conceptual contributions and other relevant work in the field, and the contribution I believe they might make, both to existing and to future work in the field.

6.2.1 Both organisations display innovativeness, but in different modes and under different conditions

I now discuss the study's findings under the six headings given above. However, before doing this, it is important to emphasise that the discussion in the previous chapter does not show that the practitioner teams in one of the two case study organisations are innovative and those in the other are not. Rather, it shows that in one, teams are more effectively facilitated to learn and to be innovative than in the other. The key indicators of this difference, the data and analysis suggests, are (a) the different degrees and kinds of autonomy afforded to practitioners in the two organisations; (b) the extent to which practitioners are enabled and facilitated to interact both formally and informally with colleagues in different teams, with different specialisms and in different organisations and (c) the extent to which they give time to 'writing up' and peer review activities of all kinds, formal and informal, planned and contingent. Each of these indicators is elaborated in more detail in later sections of this chapter. The reasons for these differences between the two organisations, it is suggested, can largely be found in the differences between the

'productive systems' within which the two organisations work, and particularly in the ways the different vertical 'structures of production' (Felstead et al 2009) act on each organisation. In the case of TLZ R&D, these structures provide a political and financial environment in which the explicit and tacit pedagogies experienced by its practitioners are both closely aligned and in broad terms enabled and supported. In effect the productive system at present allows the creation of a space of relatively high autonomy within which the TLZ practitioners work, and within which the TLZ R&D division is enabled to be highly expansive (Fuller and Unwin 2004, Derrick 2014). WBC practitioners also work within a space of autonomy, but it is far more circumscribed and restricted, and at the same time the pressure they are under to achieve their targets leaves them little time for reflection, writing up and peer review activities, which are effectively structured as taking them away from their 'real' work. They are at times frustrated about their situation, but their commitment to their vocational purpose as teachers in a public sector organisation sustains their largely positive motivation (Fuller et al 2018).

6.2.2 Practitioner motivation

The data from the two organisations suggests that four main factors are important in relation to developing and sustaining the positive dispositions and affective qualities of practitioners associated with learning and innovation through their practice. The first is the conviction that they are working for an organisation with a long-established and stable reputation for achieving high standards and outputs of work. Both groups of practitioners value and enjoy working for organisations known to be high-performing, as they see this as validation of their own specialist knowledge, professionalism and expertise within their own community of specialist practice. The second factor is closely connected: they trust the management of their organisation

to act competently and with probity (even if their decisions don't always please everyone), and to demonstrate respect for the specialist expertise of their staff by consulting them when appropriate. Thirdly, they are committed to the overall mission and objectives of their organisation, and in general support its strategic plans for achieving these objectives. Finally, they feel that their work serves a worthwhile public purpose: it benefits their community, however loosely this may be defined, and they also see themselves as part of the much larger community of those who work directly to support and maintain civil society: it is evident from the data that this sense of public purpose is important for practitioners in both these two organisations, whose cultures remain strongly 'public sector' (Fuller et al 2018). Mazzucato (2017, 2018) argues that such public purpose commitment and motivation should be a key element of policy development on social and technological innovation.

6.2.3 Teams

In relation to the working of project teams, the evidence points to six key factors that are likely to support learning and innovation: the first is that the goals and problems to be tackled by the team are 'swampy' (Schön 1983) and therefore challenging. The more complex and multi-disciplinary the problems are, the more they will require the team to challenge their own thinking, to acquire new knowledge, to create new representations of their work, seek ideas and review from others within and beyond their team, and to be attentive to insights from other domains of practice that might turn out to be relevant and helpful. If the project's goals are not demanding in this way, learning and innovation is less likely to be stimulated.

Secondly, the study suggests that the extent to which teams exercise autonomy in the organisation of their work, in designing their own work processes and their own intermediate goals, for example, is associated with learning and innovation (Morgan 1997, Fuller and Unwin 2010). Designing their own work processes includes collectively planning timetabled frameworks of action, including the division of tasks between team members, identifying resources needed and colleagues outside the team who might act as formal or informal peer reviewers, timetables of team meetings, and project milestones. They may be expected to account for these design decisions, but ideally this is less for management monitoring than as a starting point for ongoing formative review within the team and by peers. As an element of this autonomy the study suggests that innovation is supported if in principle teams can also, from the perspective of their knowledge of specific technological, and/or market developments, make the case for developing, adapting or changing overall organisational goals.

Thirdly, teams are ideally made up of practitioners with different specialisms and ranges of practical experience. This increases the resource base supporting project work, and the possibility of learning across boundaries within the team. Teams may include new recruits to the organisation, or even apprentices, for whom project team-working is the major framework for their induction into the work of the organisation (see Derrick (2014) for this feature in the context of TLZ R&D): the team's activities thereby include an explicitly pedagogical dimension, with implications for all its members and in particular for the designated team leader.

Fourthly, teams are enabled and encouraged to be highly communicative in both formal and informal modes – this may involve working in close physical proximity, though with digital applications this is not essential, as demonstrated by TLZ R&D in this study. The communicative tone is set and maintained primarily by the team leader: though this is partly procedural and

therefore a formal issue (email protocols for example), this insight demonstrates the importance of the quality of the social relationships and trust, not only between members of the team, but with a wider range of colleagues within and beyond the organisation, in relation to the point about 'boundary-crossing' discussed below. This point illustrates as strongly as any other the significance of the affective realm for effective practice in any dynamic and changing context (Orr 1996, Wenger 1998, Jensen et al 2007, Milligan et al 2014, Gherardi 2012).

Fifth, team members need to act collaboratively and to share knowledge and ideas rather than to hoard them. This may be a problem in a competitive technological context, in which personal gain or career advantage might be a major motivational factor, though any tendency for this among the practitioners in this study's two organisations was offset by their strong public purpose orientation. The issue of intellectual property is a routine one governed by well-understood formal procedures for TLZ R&D, at the level of both research partnerships (which may well be international), and in principle at the level of individual practitioners; however, the issue is likely to be significant for innovative work in any organisation.

Finally, the previous points all imply the importance of particular approaches to leadership in project teams, and within organisations as a whole. These are expressed in practical terms by Fuller and Unwin's (2004, 2006) well-known notion of 'expansive' as opposed to 'restrictive' approaches to the management, planning and design of work processes. The present study unequivocally adds to the evidence from a wide range of practitioner contexts supporting the adoption of 'expansive' approaches to leadership (see for example Fuller et al 2003; Felstead et al 2007, 2009; Fuller and Unwin 2010).

6.2.4 Team-working practices

This study suggests that learning and innovation within project teams are supported by three specific practices, potentially applicable in any context. In TLZ R&D these were found to be embedded and largely tacit within its culture, norms and expectations, as 'part of organisational DNA' (Derrick 2014); in WBC, on the other hand, although present, they were found to be restricted and negatively constrained.

The first of these key processes is what I have referred to as 'writing-up'. A central element of the day to day practice of practitioners in TLZ R&D, but far less so in WBC, is writing, from highly brief and informal notes used as aides memoires, through slightly more formal reports for sharing with other team members, or made during informal meetings as tools for collective thinking and decision-making, to team-level progress reports, formal papers published within the organisation and occasional externally-published papers. (Depending on the specialist domains involved, 'writing' here may be understood broadly to include charts, diagrams, drawings, chord sequences or choreography charts; also physical demonstrations, as in 'how about doing it like this?' - that is, in sum, any appropriate mode for the representation of practice.) Informal 'writing up' crystallises thought and makes it available for sharing, discussion, and strategic decision-making. It is the currency of collaborative team-working over extended time or on complex projects. The products of writing up, however informal, are significant representations of practice, and constitute the raw material for making progress in the task at hand. Although learning always has tacit elements, innovation almost always needs to be expressed in terms of new or adapted representations of practice: these are always examples of what is meant by 'writing up'.

The second key type of team-work process identified as desirable for learning and innovation in the study is 'peer review', which is closely associated with 'writing-up'. It is a process

through which the representations of practice produced by 'writing-up' are shared with members of the team, or perhaps by people outside the team, and subjected to formative evaluation perhaps resulting in an iteration or improved representation, either of the task itself, or of the strategy the team is using to achieve the task. Various dimensions of peer review are likely to be present in every work process leading to sustained innovation.

The third type of work process the study highlights is 'boundary-crossing'. This is a general orientation towards looking to extend the range of resources brought to bear on the project tasks, by purposefully taking steps to go beyond the boundaries, for example, of domains of expertise, or of culture, or of the team, department or even of the organisation, seeking inputs, usually in the form of feedback on some kind of representation of a specific task or problem, with the idea of bringing different perspectives to bear on the issues. It also includes the deliberate selection of projects which involve the intersection of different domains of expertise or areas of experience (Edwards 2010). Representations used in these processes can become 'boundary artefacts' (Engeström 1999, Akkerman and Bakker 2011) which form a locus for communication and understanding and perhaps development and construction, across the relevant boundaries.

6.2.5 Organisational environment

The study suggests that four key features of the organisational environment are likely to support learning and innovation: firstly, the organisation should explicitly support and informally foster a culture of social relations that encourages and enhances co-operative team-working, informal and social interaction and above all, sharing ideas, formally and informally, as a critical element of work (Orr 1996, Jensen et al 2007, Milligan et al 2014). Secondly, organisations need to

provide facilities designed purposefully to support these kinds of social and cultural behaviours: in practice this includes domain-specific technical equipment, offices and meeting spaces, and communication and networking facilities; but it also includes spaces and facilities for the informal and social activities that the study suggests are critical for effective innovative team-working: spaces for making coffee and eating lunch together, for example. Thirdly and crucially, organisations need to ensure that time is available for such social interactions and for the kinds of working activity that may not directly produce solutions but are critical steps on the way to the production of solutions – what the literature refers to as the making of provisional representations of practice, and which the study suggests is vital for innovative team-working.

Finally, innovative team-working is supported by clear organisational goals, and strategic frameworks for achieving them (Milligan et al 2012). The study unsurprisingly suggests that if practitioners understand, respect and are committed to their organisation's goals, learning and innovation produced through aiming to achieve them will be supported. Furthermore, in both these organisations, the fact that their goals had a strong public purpose orientation was a strongly positive factor. The study also suggests that, provided organisational goals and frameworks are not unnecessarily over-specified, practitioners can use the constraints embodied in them to support their work, an example of the 'loose-tight' principle of organisational effectiveness (Bateson 1976, Morgan 1997, Marchand 2016). Formulating clear goals in the context of complex, multi-disciplinary problems is likely to be achieved less by framing objectives in terms of the internal parameters of problems themselves, and more in terms of the practical, social and/or economic benefit that is envisaged, ie in terms of a mission (see, for example, Mazzucato (2017) for this argument in the context of designing state policy frameworks: the study suggests that the same argument is applicable at the level of organisations.)

6.2.6 'Tacit pedagogy' and 'Entanglement' in conceptions of workplace learning and innovation

In this study, I have made primary use of three conceptual frameworks found in the literature of the emergent paradigm: the 'Expansive-Restrictive Continuum' (Fuller and Unwin 2004), the 'Systems of Production' framework of Felstead et al (2009), and Guile's theory of 'Recontextualisation' (2014). As a result of carrying out this study and analysing the data collected, I offer two new concepts which I propose as helpful refinements to these and other theoretical frameworks found in this field of study: 'tacit pedagogy' and 'entanglement'. 'Tacit pedagogy' encompasses all aspects of environments for practice which influence practitioners, in both enabling and constraining senses, and, critically, including those modes of knowledge and innovation described by Jensen et al (2007) as 'Doing, Using and Interacting' (DUI). It also takes account of those aspects of Science, Technology and Innovation (STI) understood by Jensen and his colleagues as wholly explicit and measurable (2007), which can act in tacit and affective ways as well (see for example Law 1987 (2012 ed), Knorr Cetina 1999, Suchman 2006, Gherardi 2012). 'Tacit pedagogy' is a concept that links Guile's account of 'recontextualisation' as a description of practice (2014), with Fuller and Unwin's framework for understanding and evaluating the organisational environment for practice (2004). The key conceptual function it serves is to delineate the space of potential within practice which allows us to account for unplanned or unexpected outcomes (both desirable and undesirable) of practice. It is important that this space is understood to include explicit, formal, codified elements of practice, but that it is not restricted to these. These outcomes may occasionally, if recognised and codified in some way, become identified as new knowledge or as innovations. This space appears in Guile's account of 'recontextualisation' (2014) as an implication of the essentially unpredetermined nature of the

judgements made by practitioners on the value and validity of each other's representations of practice. However another dimension of this space is constituted by the continuous interaction, for better or worse, between the environment and practitioners, as well as between practitioners: this argument echoes those of Law (1987, 2012 ed), Knorr Cetina (1999), Suchman (2006) and Marchand (2017) which assign agency to non-human aspects of the environment. In this way the concept of 'tacit pedagogy' extends and adds flexibility to Guile's account (2014) and also to those of Fuller and Unwin (2004) and Felstead et al (2009). It is, furthermore, the context for the explorations of Carlile (2004) into the management of knowledge across domain boundaries, and of Edwards (2010) into effective 'boundary practices' in the context of solving complex interdisciplinary problems in the care sector.

'Entanglement' is proposed as a term which is both analytical and descriptive, and which overcomes the phenomenological distortion of practice in much of the literature implied by positing discrete dualities such as 'theory and practice', 'formal and informal' or 'tacit and explicit knowledge' where in fact, at the point of practice as it is enacted and takes place, they are not so distinct (see for example Merleau-Ponty 1945). For example, Young's distinctions between 'context-dependent knowledge' and 'context independent knowledge' (Young 2007) and 'powerful knowledge' and 'everyday knowledge' (Young and Muller 2013), are good examples of conceptual distinctions which do not exist clearly in practice, but which are in fact 'entangled'. Another example might be Carlile's (2004) categorising the properties of knowledge at boundaries as 'difference, dependence, and novelty' (Carlile 2004 p 556). My argument is that practitioners exercise judgement in managing and mediating this entanglement, for better or worse, in their continual construction, reconstruction and recontextualisation (Guile 2014) of practice. To propose the concept of 'entanglement' is not to suggest that there is no value in making use of

these intellectual distinctions: rather it is a reminder that such conceptual distinctions distort practice. It is striking how clearly the data from this study emphasises this point.

The point I am making in introducing this term is, on the basis of the data in this study, similar to Pickering's (1995), but I think his term 'the mangle of practice' carries with it distracting and mostly irrelevant connotations of violence. His metaphor does suggest that practice is an essentially re-creative and potentially transformative process, in which the practitioners, their knowledge and expertise, and the environment, all go through the mangle of practice and are renewed in the process; but it also suggests that this process is somehow independent of the individual contributions of practitioners. For me, the concept of 'entanglement' carries with it the idea that practice consists of a continual struggle with, and pushing against, the constraints and limitations of our knowledge and of the environment, a struggle that consists partly in overcoming the physical resistance of the world, but also in discovering how it can be made to work better for us.

6.3 To what extent has the study answered its original research questions?

I believe that this study has succeeded in producing evidence supporting substantive answers to the specific questions it was investigating. In this section I discuss this assertion in relation to the main research question and then the three subsidiary ones. I then elaborate the study's findings in relation to five specific themes: practitioner motivation; teams; team-working processes; the organisational environment; and finally, 'tacit pedagogy' and 'entanglement' in conceptions of workplace learning and innovation.

The main question for the investigation was:

'How do practitioners in high-performing organisations make use of informal modes of learning and team-working to support innovation?'

The study has suggested a number of clear strategies involving informal modes of learning and team-working, used by expert practitioners to support innovation, as elaborated in detail in the last chapter. In particular the evidence from this study highlights the significance of social interactions between team members and other potential 'reviewers' of their work, and therefore of the social and cultural norms operating within teams and the wider organisation for productive and innovative work. Key work processes are identified as being central to innovative working, and all these are more productive if they can be utilised flexibly in provisional, informal modes (Jensen et al 2007): these processes include 'writing-up' (Suchman 1987, Nonaka and Tageuchi 1995, Felstead et al 2007), 'peer review' (Orr 1996, Edwards 2010, Guile 2014) and 'boundary-crossing' (Gibbons et al 1994, Edwards 2010, Akkerman and Bakker 2011). Formal examples of these processes are much easier to observe, but in the most productive and innovative contexts these are merely the tip of the iceberg: ideally these modes of activity are being used at all levels of informality, more or less continuously (Orr 1996, Wenger 1998, Toulmin 1999, Jensen et al 2007, Edwards 2010, Milligan et al 2014).

Three subsidiary questions were also investigated by the study, the first of which was:

'What informal features of organisational culture, work processes and strategic orientation support innovation in these organisations?'

The study found that to support these informal modes of working leaders need to provide clear goals for the work of the practitioners and clear overall strategic directions for achieving them

(Milligan et al 2012); they need to promote social and ethical cultures which optimise trust, informal interactivity and the sharing of knowledge, within teams, the organisation as a whole, and beyond as far as possible (Fox 1974, Senge 1996, Morgan 1997, O'Neill 2002, Edwards 2010, Gherardi 2012); they need to be explicit about the importance of 'writing-up', 'peer-review' and boundary-crossing' as principles for effective practice, providing hardware and facilities including relevant kit, communication tools, social spaces, and above all, time within agreed working hours for the informal modes of the work processes and principles identified above.

The second and third subsidiary research questions were

'How do these features interrelate with formal features of these organisations?'

and

'How are learning, innovation and practice interrelated conceptually?'

The study has suggested that the overall answer to these questions is contained in the two conceptual terms 'tacit pedagogy' and 'entanglement', proposed here as helping provide a more nuanced understanding of innovative team-working. The implication of the idea that formal and informal modes of activity are fundamentally entangled in practice suggests that organisations need to work to ensure that as far as possible any formal and explicit mission statements, policy documents, and procedural frameworks are written in such a way as to work with the grain of informal interactivity of the kinds mentioned above, rather than limiting or obstructing them. The study suggests that learning and innovation can to all intents and purposes be treated as identical types of organisational objective. Both are optimised if expert practice is understood and supported as fundamentally informal, interactive, collaborative and social (Toulmin 1999, O'Neill 2002), and that formal dimensions of practice, if over-specified or structured as limitations or

inhibitions of productive informal interactivity, can actually work against the organisation's objectives (Argyris and Schön 1974, 1978, Jensen 2007, Gherardi 2012).

6.4 Limitations of the study

There are clear limitations to this study in relation to the small number of organisations and teams investigated. The emergent paradigm for learning emphasises strongly the context-bound nature of knowledge, and the uniqueness of situations, and so the difficulty of making confident generalisations however thorough and methodical the study. This issue applies at the level of teams within organisations too, and a further specific limitation of this study is that I was only able to recruit one team within TLZ R&D, whereas members of three teams of practitioners from WBC agreed to participate. Also, as in all qualitative research projects, collecting more data over more time and from more participants is always in principle desirable.

On the other hand, these two case studies, despite these acknowledged limitations, have both nevertheless provided rich and compelling stories, which I suggest constitute 'telling cases' (Mitchell 1984). The methodological approach adopted in this investigation embodies the emergent paradigm perspective, in which detailed case studies providing mainly 'thick description' (Geertz 1983) of specific contexts, even though they cannot give us certain knowledge of what might 'work' in other situations, nevertheless provide insights and ideas that can support advances in both theory and practice, albeit always tentative and provisional. Furthermore, the specific limitation concerning data on teams within TLZ R&D is made up for partially by my earlier study

(Derrick 2014) of the same organisation, which involved a further 11 interviews with different people within TLZ R&D. The study's objectives and methodological approach were not identical but comparable, and its findings about the organisation align closely to the findings of this study.

A final aspect of the limitations of the thesis needs to be stated: there has not been space to discuss the full range of coded responses. As outlined in chapter 3, the discussion and findings have largely been based on those codes to which the responses were found to be most significant for either organisation, or to be most different between the two organisations – the level of significance having been calculated mathematically based on the frequency of occurrence and the spread of responses to that code among the practitioners. Prioritising codes and issues for discussion in this way was necessary to keep within the limitations of the word count. This may have created the impression of homogeneity between the responses reported, either within or across the two organisations; however, the discussion has still tried, within its constraints of space, to present nuances and contradictions between the responses where they were found.

Furthermore, a different approach to sampling may well have produced a more varied range of responses. The teams might have been selected at random within each organisation, for example. But this approach may well also have selected teams some or all of whose members did not want to participate in the research, and whose responses might have been more grudging and based on less understanding of the study's research perspective. A technical solution to this dilemma would be to have every practitioner team in each organisation participate in the study, but this would have required much more time than was available, and is also unlikely to have been agreed by the participating organisations.

6.5 Impact: contribution to my professional development and to my practice

The study has increased and deepened my understanding of the links between learning, innovation and practice. It will therefore materially augment, enrich and sharpen my own professional development: as a teacher educator, as a researcher, and as a 'general practitioner' in a large, complex and rapidly-evolving organization. It represents the latest stage of a long train of thinking which originated in my work first as a teacher, then as a teacher educator, and now as a social science researcher and teacher specialising in the field of workplace practice and innovation. This chain of theoretical analysis can be delineated in a simplified way as a series of back and forth progressions: from practice-based teacher education to generic practitioner education through work; from this to the nature of teacher knowledge and expertise; from this to the collective, social and situated nature of processes of learning through activity; and finally from this to the relationship between collective practitioner learning, activity and innovation.

My professional interest in the nature of teacher education and in how it might be researched and improved was the original driver for these developments in my thinking and in the focus of my research; however, it has taken me from a highly specific focus on the particular knowledge and practice of teachers and teacher educators, to a much more generalised perspective on practice, in which teachers are just one group of practitioners; and also, through the focus on innovation, to thinking about the social construction of technology, and latterly to the development of social, organisational and political frameworks to support technological innovation to serve socially useful civic purposes.

This progression has not been nearly as linear or as neat and tidy as this account might suggest: rather, I have often been thinking and reading about different links in the chain at the same time, and not necessarily in the order given above – in fact, there have sometimes been leaps and connections made across disciplinary divides, as well as returns to earlier elements of the chain at various times, as a result of insights and ideas derived, often accidentally, from my experience as a working teacher educator, from conversations and debates with colleagues and friends, from reading or from lectures that may or may not have been formally planned as part of my professional development, and through links with other work in related fields taking place within my department, in the wider university, in the further education sector generally, and in my non-work activities, which have caught my attention. This apparently 'scatter-gun' approach to my professional work has always been congenial to me, but in recent years I have come to think about it, and to some extent to use it, as a deliberate strategy; one for which, as I have discovered in the course of this study, there is ample theoretical and practical justification.

Finally in this section, I need to consider possible impacts of this study on the two case study organisations. As part of my initial approach to both organisations I offered to share my findings with them, and furthermore, if they wished, to lead seminars on the study as a contribution to strategic organisational and staff development. So far neither organisation has taken up this offer but I intend to contact them both again to reiterate my willingness to provide feedback. As I have elaborated above, the findings have both practical and strategic implications for any organisation's strategic managers, and its practitioners. The 'productive systems' analytical framework (Felstead et al 2009) suggests that while the present configuration of the 'structures of production' of WBC and TLZ R&D provide very different palettes of constraints and opportunities for strategic action, both organisations nevertheless have scope and agency. Even if this is limited in WBC's case by

comparison with TLZ, Felstead et al's argument (2009) is that the 'structures of production' are dynamic and continually shifting, so that the balance of constraints and opportunities may well shift in the future. Furthermore, whatever the situation with respect to the 'structures of production', both organisations would benefit, the study suggests, by focussing on the three modes of informal and formal practice identified in the study, and considering how better to support and optimise them in their teams' everyday practice.

6.6 Pointers to further research

I believe this study demonstrates the value of more comparative studies of workplace practice in different domains which make use of similar conceptual and methodological approaches. Conceptualising learning and innovation within workplaces has always been complex and problematic. Research within the standard paradigm addressed this complexity through simplifications and generalisations which emergent paradigm studies have argued are grossly inadequate and misleading: however, many more recent studies still make use of theoretical and conceptual distinctions and abstractions which help thinking but have the effect of distorting how practice is actually enacted, and especially, it is suggested here, practice that is more likely to be innovative.

A key area in which further research is needed, perhaps making use of some of the conceptualisations and modes of practice highlighted in this study, is into modes of practice within the fast-expanding sector of digital platform employment. Here we see work processes being increasingly controlled, driven and monitored algorithmically (see for example Margaryan 2016, Srnicek 2017, Eurofound 2018). This clearly has implications for the autonomy, discretion, identity

and configuration of teams and practitioners, and for their capacity to influence organisational strategy. The key finding of the present study, of the significance of informal interactions within teams for formal organisational outcomes, needs to be examined in these digital platform work situations, to generate insights into similarities and differences between these and more conventional contexts of practice. For similar reasons, in-depth studies of practice within teams working in different organisational contexts but within the same specialist domains, making use of this study's methodological and conceptual approaches, would also be useful.

The main domain of professional practice during my career, which has been teaching in a range of diverse contexts, would be a case in point. In an earlier piece of work (Derrick 2013), I argued that research on teacher education falls into three categories, the primary focus of which are respectively 'professional', 'teachers', and 'learning'. Only some studies within the third group, I suggested then, have been concerned directly with improving professional practice. I would now argue that few even of these studies take sufficient account of the way the practice of teaching, for better or worse, is at the same time a reflection of and shapes both the teachers themselves, and the organisational environments in which they work. It seems ironic to me that so few studies of teacher education have made use of the insights of Beckett and Hager (2002) on the standard and emergent paradigms for learning, of the Expansive-Restrictive Continuum (Fuller and Unwin 2004), of Felstead et al's (2009) notion of 'Systems of Production', of Edwards's (2010) account of the 'Relational Turn in Expertise' or of Guile's (2014) account of 'Recontextualisation'. I suggest that making use of such conceptual approaches might bear significant fruit in studies aiming to understand and develop expertise in teaching, which is by any standards, a paradigm example of a dynamic and complex practice.

Chapter 7 References

Akkerman, S. and Bakker, A. (2011). Boundary crossing and boundary objects. *Review of Educational Research* 81 (2), pp 132–169

Argyris, C. (1977). Double Loop Learning in Organizations, *Harvard Business Review* 55 (5), pp 115-121.

Argyris, C., Putnam, R. and MacLain-Smith, D. (1985). *Action Science Concepts, Methods and Skills for Research and Intervention*. San Francisco: Jossey Bass

Argyris, C. and Schön, D. (1974) *Theory in Practice. Increasing professional effectiveness*. San Francisco: Jossey-Bass.

Argyris, C. and Schön, D. (1978). *Organizational learning: A theory of action perspective*. Reading, Massachusetts: Addison Wesley

Aristotle (c.330 BCE, 2004 ed). *Nicomachean Ethics*. London: Penguin

Bakhtin, M. (1981). Discourse in the novel. In M. Holquist (ed.) *The Dialogical Imagination*. Austin: University of Texas Press, pp 259-422.

Baptista, J (2009). Institutionalisation as a process of interplay between technology and its organisational context of use. *Journal of Information Technology* 24, pp 305–319

Barley, S. (1996). Forward. In Orr, J. *Talking about Machines: the Ethnography of a Modern Job.* Ithaca, NY: Cornell Unniversity Press, pp xi-xii

Bateson, G. (1972, 2000 ed). *Steps to an Ecology of Mind*. Chicago: University of Chicago Press

Beatty, B. (2011). Seeing Workplace Learning through an Emotional Lens. In Malloch, M., Cairns, L., Evans, K., and O'Connor, B. (eds), *The Sage Handbook of Workplace Learning*. London: Sage, pp 341-355

Beck, U. (1992). *Risk Society: Towards a New Modernity*. London: Sage

Beck, U. (1994). The Reinvention of Politics: Towards a Theory of Reflexive Modernisation. In U. Beck, A. Giddens and S. Lash, *Reflexive Modernisation: Politics, Tradition and Aesthetics in the Modern Social Order*. Cambridge: Polity Press

Becker, G. (1967). *Human capital and the personal distribution of income: an analytical approach.* Michigan, USA: Ann Arbor

Beckett, D. and Hager, P. (2002). *Life, Work and Learning: Practice in Postmodernity*. London: Routledge.

BERA (2018). *Ethical Guidelines for Educational Research* (4th edition). London: British Educational Research Association

Bereiter, C. (2002). *Education and mind in the knowledge age*. Hillsdale, NJ: Lawrence Erlbaum

Bessen, J. (2015). *Learning by Doing: The Real Connection between Innovation, Wages, and Wealth*. London: Yale University Press.

Billett, S. (2001a). "Learning through work: workplace affordances and individual engagement", *Journal of Workplace Learning* 13 (5), pp 209 – 214

Billett, S. (2001b). 'Co-Participation: Affordance and Engagement at Work'. *New Directions for Adult and Continuing Education* 92, pp 63-72

Billett, S. (2004). Learning through work: workplace participatory practices. In H. Rainbird, A. Fuller, and A. Munro (eds) *Workplace Learning in Context*. London: Routledge, pp.109-125

Bishop, D. (2017). Affordance, agency and apprenticeship learning: a comparative study of small and large engineering firms. *Research in Post-Compulsory Education* 22 (1), pp 66-86

Boreham, N. (2000). *Final Report of TSER Project on Work Process Knowledge*. Brussels: European Commission

Bourdieu, P. (1977). *Outline of a Theory of Practice*. Cambridge: Cambridge University Press

Brandom, R. (2000). *Articulating reasons: an introduction to inferentialism*. Cambridge, MA: Harvard University Press

Brown, J.S., Collins, A. and Duguid, P. (1989). Situated Cognition and the Culture of Learning. *Educational Researcher* 18 (1), pp 32-42

Brown, J.S., and Duguid, P. (1991). Organisational Learning and Communities of Practice: Towards a Unified View of Working, Learning and Innovation. *Organization Science* 2 (1), pp 40-57

Brown, J.S. and Duguid, P. (2001). Knowledge and Organization: A Social-Practice Perspective. *Organization Science* 12 (2), pp 198-213

Burns, T. and Stalker, G.M. (1961, 1977 ed). *The Management of Innovation*. London: Tavistock

Carlile, R. (2004). Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries. *Organisation Science* 15 (5), pp 555-568

Coffield, F. (2000). The structure beneath the surface: reassessing the significance of informal learning. In Coffield, F. (ed), *The necessity of informal learning*. Bristol: The Policy Press, pp 1-11

Colley, H., Hodkinson, P. and Malcolm, J. (2003). *Informality and Formality in Learning*. London: Learning and Skills Research Centre

Collin, K. (2002). Development Engineers' Conceptions of Learning at Work. *Studies in Continuing Education* 24 (2), pp 133-152

Crossan. M (2003). Altering theories of learning and action: An interview with Chris Argyris. *Academy of Management Executive* 17 (2) pp 40-48

Davies, H. (1987). *Sartre and 'Les Temps Modernes'*. Cambridge: Cambridge University Press

Derrick, J. (2012a). *An investigation into generic forms of purposeful practitioner learning*. Unpublished Ed D paper written for MOE 1. Institute of Education Doctoral School

Derrick, J. (2012b). *Learning through practice: an interim report on a pilot study of generic forms of purposeful practitioner learning*. Unpublished Ed D paper written for MOE 2. Institute of Education Doctoral School

Derrick J. (2013). 'Practitioner learning', not 'professional learning': towards a non-technocratic model of autonomous development for post-compulsory sector teachers. *Research in Post Compulsory Education* 18 (3) pp 269-279

Derrick, J. (2014). *Learning through practice: a study of 'TLZ Research and Development'*. Unpublished Ed D paper written for IFS. Institute of Education Doctoral School

Drever, E. (2003). *Using Semi-structured Interviews in Small-Scale Research: A ed's Guide.* Edinburgh: SCRE Centre

Dunne, J. (1993). *Back to the Rough Ground: Practical Judgement and the Lure of Technique*. Notre Dame, IN: University of Notre Dame Press

Edwards, A. (2010). *Being an expert professional practitioner: the relational turn in expertise.* Dordrecht: Springer

Ellström, P-E. (2010). Practice-based innovation: a learning perspective. *Journal of Workplace Learning* 22 (1/2), pp 27-40

Ellström, P-E. (2011). Informal Learning at Work: Conditions, Processes and Logics. In Malloch, M., Cairns, L., Evans, K., and O'Connor, B. (eds), *The Sage Handbook of Workplace Learning*. London: Sage pp 105-119

Engeström, Y. (1993). Developmental studies of work as a testbench of activity theory: the case of primary care medical practice. In Chaiklin, S. and Lave, J. (eds) *Understanding practice: perspectives on activity and context.* Cambridge: Cambridge University Press

Engeström, Y. (1999). Innovative learning in work teams: Analyzing cycles of knowledge creation in practice. In Y. Engeström, R. Miettinen, and R. Punamäki (eds), *Perspectives on Activity Theory*. Cambridge: Cambridge University Press, pp 377-404

Engeström, Y. (2001). Expansive Learning at Work: toward an activity theoretical reconceptualization, *Journal of Education and Work* 14 (1) pp133-156

Engeström, Y. (2004). 'The New Generation of Expertise: Seven Theses', in H. Rainbird, A. Fuller and A. Munro (eds), *Workplace Learning in Context*. London: Routledge, pp 145-165

Engeström, Y. (2008*). From Teams to Knots: Activity-Theoretical Studies of Collaboration and Learning at Work.* Cambridge: Cambridge University Press

Engeström, Y. (2011). Activity theory and Learning at Work. In M. Malloch, L. Cairns, K. Evans and B. O'Connor (eds), *The Sage Handbook of Workplace Learning*. London: Sage, pp 86-104

Eraut, M. (2000). Non-formal learning, implicit learning and tacit knowledge in professional work. In Coffield, F. (ed), *The necessity of informal learning*. Bristol: The Policy Press, pp 12-31

Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education* 26 (2), pp247-273

Eurofound (2018). *Automation, digitalisation and platforms*. Available at https://www.eurofound.europa.eu/publications/report/2018/automation-digitalisation-and-platforms-implications-for-work-and-employment. Accessed 05-01-19

Evans, K. and Kersh, N. (2004). Recognition of tacit skills and knowledge: sustaining learning outcomes in workplace environments. *Journal of Workplace Learning* 16 (1/2), pp 63-74

Evans, K. Kersh, N. and Sakamoto, A. (2004). Learner biographies: exploring tacit dimensions of knowledge and skills, in H. Rainbird, A. Fuller and A. Munro (eds), *Workplace Learning in Context*. London: Routledge, pp 222-242

Felstead, A., Fuller, A., Jewson, N., Kakavelakis, K. and Unwin, L. (2007). Grooving to the same tune? Learning Training and productive systems in the aerobics studio. *Work, Employment and Society* 21 (2), pp189-208

Felstead, A., Fuller, A., Jewson, N. and Unwin, L. (2009). *Improving Working as Learning*. London: Routledge

Flyvbjerg, B. (2001). *Making Social Science Matter*. Cambridge: Cambridge University Press

Fox, A. (1974). *Beyond Contract: Work, Power and Trust Relations*. London: Faber

Francis, D. and Bessant, J (2005). Targeting innovation and implications for capability development. *Technovation* 25 (3), pp 171–183.

Fuller, A. and Unwin, L. (2004). Expansive learning environments: integrating organisational and personal development. In Rainbird H, Fuller A, and Munro, A. (eds), *Workplace Learning in Context*. London: Routledge, pp 126-144

Fuller, A. and Unwin, L. (2006). 'Expansive and restrictive learning environments', in K. Evans, P Hodkinson, H. Rainbird, and L. Unwin (eds), *Improving Workplace Learning*. Abingdon: Routledge

Fuller, A. and Unwin, L. (2010). 'Knowledge Workers' as the New Apprentices: The Influence of Organisational Autonomy, Goals and Values on the Nurturing of Expertise. *Vocations and Learning* (3), pp 203-222

Fuller, A., Hodkinson, H., Hodkinson, P. and Unwin, L. (2005). Learning as peripheral participation in communities of practice: a reassessment of key concepts in workplace learning. *British Educational Research Journal* 39 (1), pp 49-68

Fuller, A., Ashton, D., Felstead, A., Unwin, L., Walters, S. and Quinn, M (2003). *The Impact of Informal Learning at Work on Business Productivity.* Leicester: Centre for Labour Market Studies, University of Leicester

Fuller, A., Halford, S., Lyle, K., Taylor R. and Teglborg A-C (2018). Innovating for a cause: the work and learning required to create a new approach to healthcare for homeless people. *Journal of Education and Work*. DOI: 10.1080/13639080.2018.1447654

Galbraith, J. (1982): 'Designing the Innovative Organisation'. *Organisational Dynamics* 10 (3), pp 5-25

Geertz, C. (1973). *The Interpretation of Cultures*. New York: Basic Books

Geertz, C. (1983). *Local knowledge.* New York: Basic Books

Gherardi, S. (2009). Knowing and learning in practice-based studies: an introduction. *The Learning Organisation* 16 (5), pp352-359

Gherardi, S. (2012). 'Why do practices change and why do they persist? Models of explanations'. In Hager, P., Lee, A., and Reich, A. (eds), *Professional and Practice-based Learning*. Dordrecht: Springer, pp 217-231

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman S., Scott P., and Trow M. (1994). *The New Production of Knowledge: The dynamics of science and research in contemporary societies*. London: Sage

Gibbs, G. (2007). *Analysing Qualitative Data*. London: Sage

Giddens, A. (1994). Living in a Post-Traditional Society. In U. Beck, A. Giddens and S. Lash, *Reflexive Modernisation: Politics, Tradition and Aesthetics in the Modern Social Order*. Cambridge: Polity Press

Glaser, B. and Strauss, A. (1967). *The Discovery of Grounded Theory*. Chicago: Aldine

Guile, D. (2010). *The Learning Challenge of the Knowledge Economy*. Rotterdam: Sense Publishers

Guile, D. (2014). Professional knowledge and professional practice as continuous recontextualisation: a social practice perspective. In Young, M. and Muller, J. (eds), *Knowledge, Expertise and the Professions.* London: Routledge, pp 78-92

Hager, P. (2011). Theories of Workplace Learning. In M. Malloch, L. Cairns, K. Evans and B. O'Connor (eds), *The Sage Handbook of Workplace Learning*. London: Sage, pp 17-31

Hedberg, B., Nystrom, P., and Starbuck W. (1986). Camping on seesaws: prescription for a self-designing organization. *Administrative Science Quarterly* 21, pp 41-65

Hoyles, C., Noss, R., Kent, P. and Bakker, A. (2010). *Improving Mathematics at Work: the need for Techno-Mathematical Literacies*. London: Routledge

Høyrup, S. (2010). Employee-driven innovation and workplace learning: basic concepts, approaches and themes. *Transfer* 16 (2), pp 143-154

Høyrup, S., Bonnafous-Boucher, M., Hasse, C., Lotz, M. and Møller, K. (2012). *Employee-Driven Innovation: A New Approach*. Basingstoke: Palgrave Macmillan

Hutchins, E. (1995). *Cognition in the Wild*. Cambridge, Mass: MIT Press

James, L. Guile, D. and Unwin, L. (2013). Learning and innovation in the Knowledge-Based Economy: beyond clusters and qualifications, *Journal of Education and Work*, 26 (3), pp243-266

Jensen, M., Johnson, B., Lorenz, E. and Lundvall B. (2007). Forms of knowledge and modes of innovation. *Research Policy* 36, pp 680-693

Knorr Cetina, K. (1999). *Epistemic Culture: How the Sciences Make Knowledge.* Cambridge, MA: Harvard University Press

Kvale, S. (1996). *InterViews: An Introduction to Qualitative Research Interviewing*. London: Sage

Kvale, S. and Brinkmann, S. (2009) *InterViews: Learning the Craft of Qualitative Research Interviewing*. London: Sage

Lave, J. (1993). The practice of learning. In S. Chaiklin and J. Lave (eds), *Understanding Practice: perspectives on activity and context*. Cambridge: Cambridge University Press

Lave, J. and Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University Press

Lave, J. (1988). *Cognition in Practice: Mind, Mathematics and Culture in Everyday Life*. Cambridge: Cambridge University Press

Law, J. (1987, 2012 ed). Technology and Heterogeneous Engineering: The Case of Portuguese Expansion. In W. Bijker, T. Hughes and T. Pinch (eds) *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Cambridge, Mass: MIT Press, pp 105-127

Law, J. (2004). *After Method: mess in social science*. London: Routledge

Leiris, M. (1950). L'ethnographie devant le colonialism. *Le Temps Modernes* 58, pp 357-374

Levi-Strauss, C. (1966). *The Savage Mind*. Chicago: University of Chicago Press

Lewin, K. (1946). Action Research and Minority Problems. *Journal of Social Issues* 2, pp 34-36

Littlejohn, A., Milligan, C., Pia Fontana, R. and Margaryan, A. (2016). 'Professional Learning through Everyday Work: How Finance Professionals Self-Regulate Their Learning. *Vocations and Learning* (9), pp 207-236

Marchand, T. (2017). Introduction. In T. Marchand (ed) *Craftwork as problem-solving.* London: Routledge, pp 1-29

Margaryan, A. (2016). Understanding crowdworkers' learning practices. In Proceedings of the internet, policy and politics conference, Oxford 2018. Available at: http://ipp.oii.ox.ac.uk/sites/ipp/files/documents/FullPaper-CrowdworkerLearning-MargaryanForIPP-100816%281%29.pdf. Accessed 05-01-19

Maxwell, J.A. and Miller, B.A. (2008). Categorising and connecting strategies in qualitative data analysis. In P. Leavy and S. Hesse-Biber (eds), *Handbook of Emergent Methods*. New York: Guilford Press

Mazzucato, M. (2017). *Mission-Oriented Innovation Policy: Challenges and Opportunities*. Working Paper #1. London: UCL Institute for Innovation and Public Purpose. Accessed 16-01-18 at https://www.ucl.ac.uk/bartlett/public-purpose/publications/2018/jan/mission-oriented-innovation-policy-challenges-and-opportunities

Mazzucato, M. (2018). *The Value of Everything: Making and Taking in the Global Economy*. London: Allen Lane.

McIntyre, A. (2008). *Participatory Action Research*. Thousand Oaks, CA: Sage

Merleau-Ponty, M. (1945, 1962 ed). *The Phenomenology of Perception*. London: Routledge

Miles, M.B. and Huberman, A.M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook (2nd ed)*. Thousand Oaks, CA: Sage

Milligan C., Margaryan A., Littlejohn A. (2012). Supporting Goal Formation, Sharing and Learning of Knowledge Workers. In Ravenscroft A., Lindstaedt S., Kloos C.D., Hernández-Leo D. (eds) *21st Century Learning for 21st Century Skills*. Berlin: Springer

Milligan, C., Littlejohn, A. and Margaryan, A. (2014). Workplace Learning in Informal Networks. *Journal of Interactive Media Education* 2014 (1), accessed 08-06-18 at http://jime.open.ac.uk/2014/06

Mitchell, C. (1984). Case Studies, in R. Ellen (Ed), *Ethnographic research: a guide to general conduct.* London: Academic Press, pp 237-239

Morgan, G. (1997). *Images of Organisation*. London: Sage

Nardi, B. (1997). Studying context: a comparison of activity theory, situated action models, and distributed cognition. In Nardi, B (ed). *Context and Consciousness: Activity Theory and Human-Computer Interaction.* Cambridge MA: Massachusetts Institute of Technology, pp 69-102

Nelson, R. and Winter, S. (1982). *An Evolutionary Theory of Economic Change*. Cambridge MA: Belknap/Harvard University Press

Nonaka, I. and Takeuchi H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford: Oxford University Press

Nonaka, I. (1996). The knowledge-creating company. In Starkey, K. (ed), *How Organisations Learn*. London: International Thomson Business Press, pp 18-31

Norton, J. (1991). Thought Experiments in Einstein's Work. In Horowitz, T. and Massey, G. (eds) *Thought Experiments in Science and Philosophy*. Lanham, Md: Rowman & Littlefield, pp. 129–148

O'Neill, O. (2002). *A question of trust: BBC Reith Lecture 2002*. Cambridge: Cambridge University Press.

Orr, J. (1996). *Talking about Machines: the Ethnography of a Modern Job*. Ithaca, NY: Cornell University Press

Paavola, S., Lipponen, L. and Hakkarainen, K. (2004). Models of Innovative Knowledge Communities and Three Metaphors of Learning. In *Review of Educational Research* 74 (4), pp 557-576

Pickering, A. (1995). *The Mangle of Practice: time, agency, and science*. Chicago: University of Chicago Press

Polanyi, M (1966, 2009 ed). *The Tacit Dimension*. Chicago: University of Chicago Press

Popper, K. (1972). *Objective Knowledge: An Evolutionary Approach*. Oxford: Clarendon Press

Price, O.M., Boud, D. and Scheeres, H. (2009). 'Remaking jobs: enacting and learning work practices'. *Vocations and Learning* 2(3), pp 217–234

Price, O.M., Boud, D. and Scheeres, H. (2012). Creating Work: Employee-Driven Innovation through Work Practice Reconstruction. In Høyrup, S., Bonnafous-Boucher, M., Hasse, C., Lotz, M. and Møller, K (eds). *Employee-Driven Innovation: A New Approach*. Basingstoke: Palgrave Macmillan

Robinson, N. (1999). The use of focus group methodology – with selected examples from sexual health research. *Journal of Advanced Nursing* 29, pp 905-913

Robson, C. (2011). *Real World Research* (third edition). Chichester: Wiley

Ryle, G. (1949, 1978 ed). *The Concept of Mind*. Harmondsworth: Penguin

Salomon, G., & Perkins, D. N. (1989). Rocky roads to transfer: rethinking mechanisms of a neglected phenomenon. *Educational Psychologist* (24), pp 113–142

Schatski, T., Knorr Cetina, K., and von Savigny, E. (2001). *The Practice Turn in Contemporary Theory*. London: Routledge

Schön, D. (1967). *Invention and the Evolution of Ideas*. London: Tavistock Publications

Schön, D. (1983, 1994 ed). *The Reflective Practitioner*. Burlington: Ashgate Arena

Schön, D. (1987). *Educating the Reflective Practitioner*. San Francisco: Jossey Bass

Senge, P. (1990). *The Fifth Discipline: the art and practice of the learning organisation*. London: Random House

Senge, P. (1996). The leader's new work: building learning organisations. In Starkey, K. (ed), *How Organisations Learn*. London: International Thomson Business Press, pp 288-315

Sfard, A. (1998). On Two Metaphors for Learning and the Dangers of Choosing Just One. *Educational Researcher* 27 (2), pp 4-13

Sim, J. (1998). Collecting and analysing qualitative data: issues raised by the focus group. *Journal of Advanced Nursing* 28, pp 345-352

Skinner, B.F. (1948). *Walden Two*. Indianapolis: Hackett Publishing Company

Srnicek, N. (2017). *Platform Capitalism*. London: Polity Press

Stirling, A. (2008) "Opening up" and "closing down" – power, participation, and pluralism in the social appraisal of technology. *Science, Technology, and Human Values* 33, pp 262–94

Suchman, L. (1987). *Plans and Situated Actions: The Problem of Human-Machine Communication*. Cambridge: Cambridge University Press

Suchman, L. (2006). *Human Machine Reconfigurations: Plans and Situated Actions 2nd Edition*. Cambridge: Cambridge University Press

Tamkin, P. (2004). *High Performance Work Practices*. Institute of Employment Studies. Accessed 28-05-18 at https://www.employment-studies.co.uk/system/files/resources/files/mp36.pdf

Taylor, F. (1911). *The Principles of Scientific Management*. London, UK: Harper & Brothers

Thomas, G. (2011). *How to do your Case Study: A Guide for Students and Researchers*. London: Sage

Timiyo, A.J. (2014). High Performance Work Practices: One best-way or no best-way. *Journal of Business and Management* (16) 6, pp8-14

Toulmin, S. (1999). Knowledge as shared procedures. In Y. Engeström, R. Miettinen, and R. Punamäki (eds), *Perspectives on Activity Theory*. Cambridge: Cambridge University Press, pp 53-64

Vaill, P (1996). The Purpose of High-Performing Systems. In Starkey, K. (ed), *How Organisations Learn*. London: International Thomson Business Press, pp 60-81

Vygotsky, L (c 1930, 1978 ed). *Mind in Society.* Cambridge, MA: Harvard University Press

Watson, J.B. (1913). Psychology as the behaviourist views it. *Psychological Review* 20, pp 158–177

Weick, K. and Westley, F. (1996): Organisational Learning: Affirming an Oxymoron. In Clegg, S., Hardy, C. and Nord, W. (eds), *The Sage Handbook of Organisational Studies.* London: Sage

Weiss, R.S. (1994). *Learning from Strangers: The Art and Method of Qualitative Interview Studies*. New York: Free Press

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, And Identity*. Cambridge: Cambridge University Press

Wengraf, T. (2001). *Qualitative Research Interviewing*. London: Sage

Wordsworth, W. (1798). The Tables Turned. In W. Wordsworth and S. T. Coleridge, *Lyrical Ballads*. London: J. and A. Arch

Work Foundation, The (2003). *The Missing Link: From Productivity to Performance*. The Work Foundation.

Young, M. (2007). *Bringing knowledge back in: From social constructivism to social realism in the sociology of education*. London: Routledge

Young, M. and Muller, J. (2013). On the powers of powerful knowledge. *Review of Education* 1 (3), pp 229-250

Ziliak, S. and McCloskey, D. (2008). *The Cult of Statistical Significance: How the Standard Error Costs Us Jobs, Justice and Lives*. Ann Arbor, MI: University of Michigan Press

8 Appendices

8.1 Information sheet for prospective participants

Modes of learning, innovation and 'tacit pedagogy' in workplace practice: a comparison of high-performance workplace practice in two different knowledge-intensive occupational sectors:

A research study led by Jay Derrick July 2015 – September 2017

Information for participants July 2015

I am conducting this small-scale research project as part of my Educational Doctorate at the UCL Institute of Education.

The investigation takes the form of comparative case studies of two high-performing organisations in relation to learning through practice: that is, among other things, into:
1. The ways in which practitioners in the department create and/or take advantage of opportunities for learning as they arise through the course of their work
2. The ways in which learning supports innovation, and in which the drive for innovation supports learning
3. The ways in which the organisation's cultural norms, procedures, and expected behaviours explicitly or tacitly support or inhibit learning and innovation
4. The nature of the practical links between production, innovation and learning in the work of these organisations.

The enquiry will use three main forms of data collection: semi-structured interviews and focus groups with members of two teams within each organisation, and documentation, including weekly learning logs completed by participants. Interviews are expected to last for about an hour, and to take place between September 2015 and September 2016. Interviews will be recorded and transcribed.

The research will be conducted under the guidelines of the British Educational Research Association. Data will be kept confidential according to these guidelines, and participants, unless they choose otherwise, will be unidentifiable in any publications resulting from the study. Participants will be able to withdraw from the study at any time.

If you are interested in participating as an interviewee, or in hearing more about the project, please contact Jay Derrick by email as follows:
j.derrick@ioe.ac.uk

UCL Institute of Education 20 Bedford Way, London WC1H 0AL
+44 (0)20 7612 6000 | enquiries@ioe.ac.uk | www.ucl.ac.uk/ioe

8.2 Consent form for participants

Innovation and tacit pedagogy in workplace practice: a case study: proposal for an Ed D thesis research study

A research study led by Jay Derrick May 2015 – July 2017

Participant Consent form

I have been fully informed about the aims and purposes of the project.

I understand that:

- this project aims to investigate workplace learning and innovation so as to inform potential improvements;
- there is no compulsion for me to participate in this research and, if I do choose to participate, I may at any stage withdraw my participation;
- any information which I give will be used solely for the purposes of this research project, which may include publications;
- the information which I give may be reported on in anonymised form;
- all information which I give will be treated as confidential, and pseudonyms will be used in order to preserve anonymity to the greatest possible extent

…….. …… ……..
(Signature) (Printed name) (Date)
One copy of this form will be kept by me; a second copy will be kept by the researcher.

UCL Institute of Education 20 Bedford Way, London WC1H 0AL
+44 (0)20 7612 6000 | enquiries@ioe.ac.uk | www.ucl.ac.uk/ioe

8.3 First round interview schedule

Learning, innovation and 'tacit pedagogy' in workplace practice: a comparison of two high-performing organisations in different sectors

1st round interview schedule

1. Team working
    a. Describe your team's main tasks at present
    b. Describe the way your team works
    c. What would you say is the leadership style of your team leader/your leadership style?
    d. In what ways is your team leader/are you supported in his/her/your leadership role, by the organisation?
    e. Do you help colleagues, or do they help you? How exactly, please give examples.
    f. Is learning an explicit aim of your team in any way?
2. Learning
    a. What, if anything, do you feel you are learning as a result of your work?
    b. Is learning an important aspect of work for you?
    c. Do you take deliberate steps to learn as part of your work?
    d. Are you encouraged to learn by your team leader/line manager and/or your organisation?
3. Innovation
    a. Is innovation of any kind an explicit aim of your team at present? Why is innovation important?
    b. What kinds of innovation are being aimed for? (incremental process change, or step change, or new 'product' or artefact)
    c. Is there a plan for achieving innovation? How was this plan drawn up?
    d. Do you ever make use of 'work-arounds'. Do you ever discuss these with your colleagues?
4. Artefacts
    a. What formal documents, templates, procedures, tools, etc, do you and your team use in your work? List as many as possible?

b. Do you ever have to adapt documents, procedures, tools, etc or create new ones as part of your work? Give examples

c. How important are 'unofficial' documents, procedures, tools in your work (ie artefacts you use but which are not provided by the organisation and not formally 'on the record')

5. Your workplace

a. How does your organisation help you and your team to do your work?

b. Give three words to describe the culture of your immediate team/workplace (relaxed, informal, chatty, fun, or alternatives)

c. Give three words to describe the culture of the organisation you work for

d. Do you feel the culture makes a difference to the work of you and your team? In what ways?

e. In what ways might your work be different if you were a member of

(a) A different team?

(b) A different organisation?

8.4 First focus group schedule

Learning, innovation and 'tacit pedagogy' in workplace practice: a comparison of two high-performing organisations in different sectors

1st Focus group questions

Aims of the session:

- To familiarise participants with the aims and concepts informing the study
- To get participants to identify formal and informal knowledge and resources for work, solving problems and innovation
- To discuss how these are supported or inhibited
- To speculate on how these resources could be supported better, or inhibitions removed

Key questions for discussion:

You are all experienced, and your work contributes to the activities of an organisation that is seen as outstanding in its field.

1. You all have **expertise. First,** I'd like you all to think about:
    - how that expertise is made up (what knowledge, what skills, what else?)
    - the processes through which you acquired this expertise, and
    - how you are supported in exercising your expertise by the systems and cultures of your workplace.
2. What problems do you have to deal with in relation to your work as teachers/engineers?
3. Do new problems arise from time to time? How do you deal with them?
4. Can you identify specific cases of **innovation** that have taken place in your workplace?
5. What factors enable you to do your work well at present?
6. Can you suggest changes that would help you to do your work better than now?

8.5 Second round interview schedule

Learning, innovation and 'tacit pedagogy' in workplace practice: a comparison of two high-performing organisations in different sectors

2nd round interview schedule

Remember I'm primarily interested in team leadership, learning and innovation: how does DUI support these functions?

6. Team leadership and innovation
    a. Give some examples (2 or 3) of team leadership in action in the last six months
    b. What specific qualities, capacities were useful in your view for the leader in these examples?
    c. Did any of these examples involve innovation in any way, or for any reason? (prompt if necessary: incremental process change, or step change, or new 'product', work process or procedure, or new artefact)
    d. If yes, how did innovation come about? (prompt if necessary)
    e. Was innovation an explicit aim of the team at any time?
    f. If so, was it planned in any way? How, and by whom?
    g. Describe the innovative aspect of each example (incremental process change, or step change, or new 'product', work process or procedure, or new artefact)
    h. What was the specific role of the team leader in each example? What were the roles of the team members?
    i. Insofaras there was professional learning going on in these examples, who was learning what?
    j. In carrying out each activity, or dealing with each problem, were the following terms ever used explicitly within the team:
        1. Project management
        2. Project leadership
        3. Innovation (or similar)
        4. Learning (or similar)
        5. Teaching (or similar)
    k. In dealing with each of these issues, were there disagreements of any kind within the team about how best to proceed? How were these resolved?

l. Have team objectives been achieved this year? How do you know? (remember Tasmen's 'game plan')

7. Learning
    a. Have you achieved your personal CPD targets this year? Say more about how this happened or didn't happen

8. Artefacts
    a. Did you adapt documents, procedures, tools, etc or create new ones as part of these pieces of work? Give examples

9. Your workplace
    a. How did your organisation help you and your team to deal with each of these problems, carry out each of these activities?
    b. What specific help has your organisation given to team leaders in their leadership role, in dealing with these issues and activities?
    c. Are there any ways in which the culture of your team and the way it works could be improved?
    d. Are there any ways in which the culture of your organisation and the way it works could be improved?
    e. Any big changes in the offing? How will your team face these? What will the role of the leader be?

8.6 Second focus group schedule

Learning, innovation and 'tacit pedagogy' in workplace practice: a comparison of two high-performing organisations in different sectors

Second Focus group schedule

What are the characteristics of organisations which innovate successfully over long periods?

- How can organisations in general best support their staff to deliver innovation?
- How could this organisation improve its support for innovation?
- What aspects or styles of team-working best support innovation?
- What individual personal and professional capacities best support innovation?
- What steps can individuals take to develop these capacities for innovation?
- How can organisations support their staff to develop these capacities?

8.7 Data collection log

Participant Codename	Team	Consent form	Focus group 1	Interview 1	Interview 2	Focus group 2
Sarah Thompson	BW	✔	✔ 23-10-15	✔ 08-01-16	✔ 24/06/2016	✔ 12/07/2016
Sue Yeo	BW	✔	✔ 23-10-15	✔ 08-01-16	✔ 24/06/2016	✔ 12/07/2016
Gemma Clark	BW	✔	✔ 23-10-15	✔ 08-01-16	✔ 24/06/2016	✔ 12/07/2016
Sally Miller	HW	✔	absent	absent	absent	absent
Beth Shore	HW	✔	✔ 23-10-15	✔ 11/01/201	absent	absent
Sam Jones	HW	✔	✔ 23-10-15	✔ 16/12/201	✔ 06/07/2016	✔ 12/07/2016
Geoff Robinson	MW	✔	✔ 23-10-15	✔ 12/07/201	absent	✔ 12/07/2016
Matt Dylan	MW	✔	✔ 23-10-15	absent	absent	absent
Larry Smith	MW	✔	✔ 23-10-15	✔ 11/01/201	absent	✔ 12/07/2016
Billy Rudge	RD	✔	✔ 11-03-16	✔ 15/04/201	✔ 06/10/2016	✔ 06/10/2016
Pete Lawrence	RD	✔	✔ 11-03-16	✔ 15/04/201	✔ 06/10/2016	✔ 06/10/2016
Harry Silver	RD	✔	✔ 11-03-16	✔ 15/04/201	✔ 06/10/2016	✔ 06/10/2016
Will Dunn	RD	✔	✔ 11-03-16	✔ 15/04/201	✔ 06/10/2016	✔ 06/10/2016
	transcribed					

8.8 Initial codes prior to data analysis

1. **Organisation level: Innovation integral to strategy**
   - Partnership working and innovation
   - Continual improvement, mistakes and problem-solving can lead to innovation
   - Organisation explicitly committed to high standards, 'demanding' culture
   - Formal opportunities for experimentation
   - Not in control of key contextual factors
2. **Team level: Innovation as process, not just product**
   - Efficiency works against innovativeness at team level
   - Informal styles of team working and innovation
   - Team working culture supports innovation
   - Team committed to professional learning
   - Personal commitment to subject, role and professional learning
3. **Organisation level: Expansive orientation of organisation**
   - Discretion given to teams
   - Expansive team leadership
   - Reification of 'workplace curriculum' highly developed
   - Advanced practitioners seen as innovators
4. **Organisation and team level: Social theory of learning**
   - Time and repositories available for continual sharing of knowledge and artefacts
   - Learning through doing, mistakes, life experiences, personal transitions
   - Opportunities for informal learning made available and taken
5. **Organisation and Team level: Purposeful recontextualisation**
   - Working in different contexts at the same time
   - Deliberately crossing boundaries
   - Artefacts used as tools for recontextualisation
6. **Organisation level: Capturing tacit knowledge**
   - Time for collective reflection, development of ideas, innovation
   - 'Good enough' ethos can support innovativeness
   - Formal emphasis on 'writing up' development activity

8.9 Final analytical codes after data analysis

1.	**Organisation level: Innovation integral to strategy**
1.1	Evidence of transformative orientation at organisational level (Burns and Stalker 1961, Daft and Weick 1984, Gibbons et al 1994, Morgan 1997, Felstead et al 2009, Mazzucato 2017)
1.2	Long-established, stable and explicit commitment to mission and to high standards
1.3	Partnership working supports innovation; clients as partners (Morgan 1997)
1.4	Formal opportunities for 'blue-sky' experimentation, creating spaces for happy accidents, valuing risk
1.5	Practitioners used as 'environment scanners' and contribute to strategic planning (Morgan 1997)
1.6	Not in control of key environmental factors: explicit need for improvisation
2	**Organisation level: Expansive orientation and behaviour of organisation**
2.1	Discretion given to teams, management as teaching and learning (Fuller and Unwin 2004, Høyrup et al 2010)
2.2	Practitioners have trust and confidence in organisational leadership (Fuller and Unwin 2004)
2.3	Expansive team leadership encouraged and supported (Fuller and Unwin 2004)
2.4	Reification of 'workplace curriculum' highly developed: formal professional learning (Fuller and Unwin 2004)
2.5	All practitioners seen as innovators (Morgan 1997)
3	**Team level: Innovation as process, not just product**
3.1	Need for 'efficiency' and compliance supports innovativeness at team level
3.2	Learning seen as integrated with process of innovation (Engestrom 1999, 2008)
3.3	'Remaking one's job' (Price, Boud and Scheeres 2010, Ellstrom 2010)
3.4	Informal team working culture supports innovation and problem solving (Jensen et al 2007)
3.5	Team committed, relaxed and confident about their professional learning and capacity to face challenge of change
3.6	Colleagues, partners and new team members seen as 'peer reviewers'
3.7	Personal commitment to subject, role and professional learning
4	**Organisation and team level: Social and dynamic theories of learning, knowledge and expertise**
4.1	Time available formally for reflection, sharing knowledge and collective planning (Brown and Duguid 2001, Beckett and Hager 2002, Engeström 2004)
4.2	Professional learning through doing, mistakes, life experiences, personal transitions (Lave and Wenger 1991, Nardi 1997, Brown and Duguid 2001, Beckett and Hager 2002)
4.3	Professional learning through realia, war stories, case studies, demonstration and group conversations
4.4	Professional learning through collective evaluation, participation in decisions about change
4.5	Informal and social interactions are valued, enabled and supported (Lave and Wenger 1991, Nardi 1997, Brown and Duguid 2001, Beckett and Hager 2002)
5	**Organisation and team level: Purposeful 'displacement' and/or 'recontextualisation'**
5.1	Working in different contexts: involvement in multiple communities of practice (Brown and Duguid 1991, Guile 2014)
5.2	Use of unofficial, non-canonical materials and artefacts (Brown and Duguid 1991)
5.3	Deliberately crossing boundaries: 'going beyond', 'concept displacement' (Schön 1967, Edwards 2010)
5.4	Artefacts used as tools for recontextualisation and professional learning (Brown and Duguid 1991, Hoyles et al 2010, Guile 2014
5.5	Value of 'contingent knowledge' explicitly acknowledged and operationalised (Schön 1967)
6	**Organisation and team level: Capturing tacit knowledge**
6.1	Emphasis on formal and informal 'writing up' of research and development activity (Polanyi 1966, Nonaka 1996, Knorr Cetina 1999, Jensen et al 2007)
6.2	Formal or informal use of research for strategic planning, problem-solving and decision-making
6.3	Knowledge shared informally within teams: 'group expertise' acknowledged
6.4	Operationalising new knowledge: developing imperfect, provisional tools and practice

8.10 Section of coding chart

Appendix 10

Section of Coding chart

	WBC transcripts (16-17)															
	WB Focus group #1	ST#1	SY#1	GC#1	BS#1	SJ#1	GR#1	LS#1	ST#2	SY#2	GC#2	SJ#2	WB Focus group #2	YLZ Focus group #1	BR#1	PL#1
Innovation integral to strategy																
Evidence of transformative orientation at organisational level		(127ff)		-728						(418ff),	(462ff),		(239ff), (453ff), (796ff),			338ff, 373ff,
Long-established, stable and explicit commitment to public value mission and high standards	77ff, 86ff, 91ff, 179ff, 317ff, 332ff, 362ff, 587ff,	293ff, 392ff, 403ff, 693,	64ff, 267ff, 488, 676ff,	109ff, (801ff), (821ff)	(200ff),	58ff, 223ff, 234ff, 601ff, 647ff	211ff, 225ff,	37ff, 53ff	84ff, 218ff, 266ff, 456ff, 542ff,	30ff, 82ff, 114ff, 134ff, 582ff,	114ff, 583,	76ff, 413ff, 542ff,	154ff, 239ff, 623ff, 829ff,	300ff,	67ff, 662ff, 762ff	390ff, 419ff, 524ff,
Partnership working supports innovation: clients as partners	238ff,		460				309ff, 321ff,	703ff					(204ff),			36ff, 299ff,
Formal opportunities for 'blue-sky' experimentation, creating spaces for happy accidents, valuing risk (25-08-17, 17-11-17)			(284ff)		(334ff),							80ff, 110ff,		174ff,		3ff,
Practitioners used as environment scanners and strategic planning (02-09-17)		(127ff)													640ff,	3ff, 178ff, 360ff, 419ff,
Not in control of key contextual factors: explicit need for improvisation		127ff, 392ff,						131ff, 448ff	84ff, 360ff, 697ff,	30ff, 114ff, 134ff, 582ff,						338ff,
Expansive orientation of organization																
Discretion given to teams, management as teaching and learning	292ff, 307ff, 585ff,	67ff, 80ff, 127ff, (458), (473), (480), 640, 705, 727, 755		585, 598, (599ff), (608), 611, 721, (767ff)	82, (147ff), (172ff), (334ff),	60ff	61ff, 203ff, 211ff, 287ff, 298ff,	87, 121ff, 131ff, 485ff	(9ff),	(418ff), 487ff, 511ff, (598ff),	(372ff), 575ff	110ff, (172ff), 234ff, 400ff,	79ff,	92ff,	67ff, 117ff, 246ff, 395ff, 419ff, 454ff, 503ff,	
Practitioners have the values of, and have trust and confidence in organizational leadership	292ff, (585ff,	80, 105, 409ff, (452ff), 715ff, (793ff), 842ff, 866ff,		91ff,		644, 658,			(26ff), 641ff		152ff,	234ff, 485ff, 539	270ff, 778ff, 762ff	414ff, 653ff	246ff,	158ff, 373ff,
Expansive team leadership encouraged and supported	116ff, 292ff, 573ff,	116ff, 127ff, 542, 779	39ff, (385ff),	56ff, 68ff	75ff, (80ff), 361ff,	558, (560ff)		82ff, 100ff, 191ff, 183, 297ff	246ff, 268ff, 289ff, 416ff, 520ff,	82ff, 227ff, 370ff, 625ff,		66, 506ff, 524ff,	79ff,		12ff, 67ff, 246ff, 303ff, 272ff, 594ff,	27ff, 138ff, 201ff,
Ratification of 'workplace curriculum' highly developed: formal professional learning	77ff, 150ff, 175ff, 198ff, 406ff,	80ff, 103ff, 346ff	199ff,	457ff	(183ff), (208ff), (380ff),	90ff, 106ff, 560ff			(586ff), (780ff), (809ff),			472ff,			566ff, 594ff, 710ff,	(310ff),
Formal staff development available as needed by work, all practitioners seen as innovators	99, 141ff, 252ff, 275ff,												(79ff),	92ff,	538ff,	3ff,

8.11 Example of coded passages from transcripts

Appendix 11: example of coded passages from transcripts gathered together by code clusters

Code group 6: Organisation and team level: Capturing tacit knowledge

TLZ

Focus group #1

PL Well for me quite often I've become an expert because I'm the only one in the team or department or whatever the group is that has done anything on the topic of choice, so just because I've been able to spend a week researching something that has made me a defacto expert. 14-17

PL Yeah, I agree, I do benefit greatly from those discussions, and it's almost effectively **developing a group expertise, which is one of the aims of the team really** 56-57

BR Yeah, definitely crystallise it, because compared with Lucas I'm pretty stupid, because he's down on the ground doing the work, so he's the expert, right, but then it's my job to kind of extract that information from him in a form that can then be useful to the rest of us.

JD Yes.

BR So there is a kind of summarisation, and quite a lot of the time he explains something and I say I don't understand that, what do you mean? And I'll probe further. And then gradually I'll extract from that, and I'll play back that, and say well so what you mean is X, Y, and Z, and then we kind of reach that shared understanding. And David's an expert in different fields and quite often we end up having arguments even sometimes, because they don't understand each other. But actually we end up with a common understanding at the end of the day. 61-72

Latent = tacit? (78)

BR Yes, exactly, and exploit it. **And a lot of what we are doing is all about learning about something in area A, learning about something in area B, and then combining that knowledge in a novel and innovative way. A lot of the work that we, particularly in our team do, is to do with integrating the work**, and **we build on the shoulders of giants, and there's people all around the world working on this stuff**, and **there's no way you can be innovative in isolation, it's all about collaboration**. 118-124

WD Some of it is just being aware of what other people are up to, and as an example as well I was talking to someone about traffic shaping, just the data coming down over the network, and John Rosser came around the corner, because he sits near the kitchen, and

Comment [J1]: Research

Comment [J2]: Group expertise

Comment [J3]: Informal communication helps generate new codified knowledge, through the effort of sharing

Comment [J4]: From tacit to codified, through the effort of trying to understand different languages: cf Engestrom, crossing boundaries

Comment [J5]: Recontextualisation, combination of insights from different contexts, depending on collaborative culture, writing up and using previous work as foundations

Comment [J6]: Contingent knowledge, potentially useful. store of possibly useful ideas: group expertise

Appendix 12 Graphic comparison of code incidence for WBC and TLZ

	WBC								TLZ								
Code	Total incidents of code	Average/ Transcpt	Spread	Spread %	Negative	Spread	Spread %	WBC Significance Coeff	Total incidents of code	Average/ Transcpt	Spread	Spread %	Negative	Spread	Spread %	TLZ Significance Coeff	WBS-TLZ
5.3	19	1.46	7	54%	5	2	15%	0.79	37	3.70	9	90%	1	1	10%	3.33	-2.54
3.6	13	1.00	5	38%	2	1	8%	0.38	26	2.60	10	100%	0	0	0%	2.60	-2.22
6.1	12	0.92	6	46%	2	2	15%	0.43	36	3.60	7	70%	1	1	10%	2.52	-2.09
6.3	0	0.00	0	0%	0	0	0%	0.00	17	1.70	7	70%	0	0	0%	1.19	-1.19
5.2	3	0.23	3	23%	0	0	0%	0.05	16	1.60	7	70%	2	2	20%	1.12	-1.07
2.5	5	0.38	2	15%	1	1	8%	0.06	13	1.30	8	80%	0	0	0%	1.04	-0.98
6.4	1	0.08	1	8%	0	0	0%	0.01	14	1.40	7	70%	0	0	0%	0.98	-0.97
3.4	65	5.00	11	85%	4	2	15%	4.23	52	5.20	10	100%	0	0	0%	5.20	-0.97
5.1	8	0.62	6	46%	2	1	8%	0.28	17	1.70	7	70%	0	0	0%	1.19	-0.91
6.2	5	0.38	4	31%	0	0	0%	0.12	14	1.40	7	70%	0	0	0%	0.98	-0.86
4.5	20	1.54	8	62%	5	4	31%	0.95	24	2.40	7	70%	1	1	10%	1.68	-0.73
2.4	20	1.54	8	62%	6	2	15%	0.95	18	1.80	9	90%	3	3	30%	1.62	-0.67
4.2	24	1.85	9	69%	2	1	8%	1.28	19	1.90	10	100%	0	0	0%	1.90	-0.62
1.5	1	0.08	1	8%	1	1	8%	0.01	10	1.00	6	60%	0	0	0%	0.60	-0.59
2.3	34	2.62	11	85%	3	3	23%	2.21	31	3.10	9	90%	0	0	0%	2.79	-0.58
1.4	4	0.31	3	23%	2	2	15%	0.07	10	1.00	6	60%	0	0	0%	0.60	-0.53
1.3	6	0.46	5	38%	1	1	8%	0.18	11	1.10	6	60%	0	0	0%	0.66	-0.48
5.5	0	0.00	0	0%	0	0	0%	0.00	9	0.90	5	50%	0	0	0%	0.45	-0.45
3.2	2	0.15	1	8%	0	0	0%	0.01	8	0.80	3	30%	1	1	10%	0.24	-0.23
4.4	11	0.85	6	46%	3	2	15%	0.39	10	1.00	6	60%	0	0	0%	0.60	-0.21
4.3	10	0.77	5	38%	0	0	0%	0.30	9	0.90	5	50%	0	0	0%	0.45	-0.15
5.4	24	1.85	7	54%	10	5	38%	0.99	19	1.90	6	60%	0	0	0%	1.14	-0.15
3.3	1	0.08	1	8%	1	1	8%	0.01	4	0.40	2	20%	0	0	0%	0.08	-0.07
1.1	7	0.54	5	38%	6	5	38%	0.21	7	0.70	4	40%	0	0	0%	0.28	-0.07
2.5	4	0.31	3	23%	2	2	15%	0.07	1	0.10	1	10%	0	0	0%	0.01	0.06
4.1	18	1.38	11	85%	7	6	46%	1.17	18	1.80	6	60%	0	0	0%	1.08	0.09
1.6	11	0.85	4	31%	0	0	0%	0.26	2	0.20	2	20%	0	0	0%	0.04	0.22
2.1	46	3.54	12	92%	14	7	54%	3.27	31	3.10	9	90%	0	0	0%	2.79	0.48
2.2	22	1.69	8	62%	4	3	23%	1.04	7	0.70	4	40%	0	0	0%	0.28	0.76
3.5	42	3.23	12	92%	1	1	8%	2.98	20	2.00	9	90%	0	0	0%	1.80	1.18
3.7	38	2.92	8	62%	2	2	15%	1.80	8	0.80	5	50%	0	0	0%	0.40	1.40
3.1	41	3.15	11	85%	32	10	77%	2.67	13	1.30	7	70%	8	4	40%	0.91	1.76
1.2	48	3.69	13	100%	3	2	15%	3.69	25	2.50	7	70%	0	0	0%	1.75	1.94
	565				121				556				17				

8.13 Poster

Institute of Education

UCL

How do high-performing knowledge-intensive organisations use informal modes of learning and team-working to support innovation?

Jay Derrick, UCL Institute of Education, Department of Education, Practice and Society. Supervisor: Alison Fuller

Research questions:

- How do practitioners in each team create and/or take advantage of opportunities for learning as they arise through the course of their work, and how do team leaders support them in this?
- How does learning support innovation, and how does the drive for innovation support learning?
- How do each organization's cultural norms, procedures and expected behaviours explicitly or tacitly support or inhibit learning and innovation?
- What are the implications of this study's findings for the professional learning of Further Education teachers?

1. 'Westbridge' Further Education College

Graded 'Outstanding' by OFSTED

3 teams (n=9) working with groups of students studying for academic or vocational qualifications:

- Humanities teachers
- Motor engineering teachers
- Hair and Beauty teachers

2. 'TLZ' Research and Development

Global leader in digital media and broadcasting

2 teams (n=12) working on different innovation projects involving some or all of:

- Software engineering
- Hardware engineering
- Instrument design, haptics, and User interfaces

The learning is as much from what other people in the same organisation have written before, you're standing on their shoulders. That's why 'writing up' is so important. It's part of building that co-operative, collaborative culture, writing up all the time. TLZ Engineer

Theoretical frameworks to be used for data analysis, and selected references:

- STI and DUI knowledge, tacit knowledge: (Jensen et al 2007, Ryle 1978)
- The Working as Learning framework: (Felstead et al 2009)
- Recontextualisation (Guile 2010, 2014)
- Multidisciplinary, cross boundary team-working: (Engestrom 2008)
- The Expansive-Restricted Continuum for Workplace Learning: (Fuller and Unwin 2004, 200