

# **A Study of Tutors' and Students' Perceptions and Experiences of Full-time College Courses and Apprenticeships in Plumbing**

Submitted by Simon Reddy to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Education, March 2014.

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## **Abstract**

There has been an increasing amount of interest shown in vocational education and apprenticeships in the early twenty-first century by successive governments and other parties connected with occupational training. However, the English further education sector has been described as 'chronically under-researched' (James and Biesta, 2007: 7), particularly in regard to narrative accounts of college education and pedagogy (Richardson, 2007) and there has been very little empirical research on pathways into the plumbing profession. This study explored teachers' and students' perceptions and experiences of both full-time college courses and apprenticeships in plumbing in order to deepen understanding of these particular types of vocational preparation. It also endeavoured to investigate whether the two different routes into plumbing appeared fit for purpose. Within an interpretive framework, data were collected using two main research methods. Ethnographic snapshot observations were recorded during lessons in three further education colleges and at the workplaces of five plumbing students and formal 1:1 semi-structured interviews were conducted with 15 tutors and 14 students. The data were thematically analysed.

From the many issues relating to the opportunities offered and the challenges posed by the different pathways into plumbing that this study identified, three key findings emerged. First, there was strong evidence of a dislocation between theory and practical learning, both within the college setting for full-time students and between the workplace and college settings for apprenticed learners. This had implications for both the quality of learning and the learners' levels of motivation. Second, the study revealed the importance of supervised work experience that was centred on long-term acquisition of knowledge and relationship development for apprentices with support from their college tutors and co-workers. Finally, the findings showed the importance of authentic assessment. It was found that simulations in college could not adequately replicate the experience of doing the job in the real world. Given the inherent risks and problems regularly encountered in the plumbing profession, this signalled significant health and safety implications.

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## **1 Introduction**

This interpretive study seeks to explore tutors' and students' perceptions and experiences of full-time college courses and apprenticeships in plumbing. Adopting a qualitative methodology, the research was undertaken with a variety of tutors and students from three colleges in the southwest of England. Ethnographic snapshot observations and informal conversations were used to complement, illuminate and illustrate data gathered through semi-structured interviews.

### **1.1 Background to the study focus**

The plumbing industry is part of the Building Services Engineering (BSE) sector, represented by SummitSkills, the Sector Skills Council (SSC) which incorporates electro technical, heating and ventilating, air conditioning and refrigeration, and electrical and electronic servicing (SummitSkills, 2010a). Plumbing involves work in the residential sector (e.g. domestic dwellings) as well as in commercial (e.g. schools and hospitals) and industrial settings (e.g. factories and dockyards). For the purposes of this study, references to commercial and industrial plumbing will be understood as interchangeable.

The word 'plumber' derives from the Latin 'plumbum' relating to the element of lead (Watson, 2005: 9). Historically, plumbers used lead to make cisterns and pipes to contain or carry water, but this is no longer the case due to health risks. However, some plumbers still work with lead, which is also used for roof coverings and flashings to seal buildings against wet weather. The type of work usually undertaken by contemporary plumbers is described by SummitSkills (2010a) as including:

- Installing and maintaining central heating systems, hot and cold water systems and drainage systems
- Installing, commissioning and maintaining solar water heating, rainwater harvesters and grey water recycling systems
- Installing and maintaining gas, oil and solid fuel appliances

- Installing and maintaining industrial and commercial heating, specialist appliances and fire protection systems

In partnership with employer representative bodies and stakeholders, SummitSkills (2010a) are responsible for developing national occupational standards, which are used to underpin the qualification and apprenticeship frameworks. Some key facts about the plumbing industry, described by SummitSkills (2010a) are:

- There are around 22,000 businesses in the plumbing industry, employing 62,000 people
- There are 13,000 heating, ventilating, air conditioning and refrigeration businesses or employers
- 90% of businesses employ fewer than ten people, with 85% having between one and five employees and most of the remainder employing between six and 250 workers
- 80% of people employed in the industry work as domestic plumbers, half of whom are in domestic heating whilst 20% work as commercial plumbers.

Indeed, SummitSkills (2010a) describe the plumbing industry as largely made up of small domestic firms with 63% of the skilled workforce aged between 35 and 54. Most people in plumbing training are aged over 25, with 45% aged between 16 and 24.

This study focuses on apprentices and those students entering this occupation through the undertaking of preparatory college courses plus their tutors and mentors who supported them in this process. The full-time students were mostly aged between 16 and 19, although a minority were regarded by the college as adult students because they were 20 years or over. The courses that these latter students took varied in nature. The majority of full-time adult students in this study were pursuing routes other than apprenticeships into the plumbing occupation, either through employment, self-employment or volunteering. A number of these adult students were enrolled on full-time courses, which provided them with a preliminary way of entering the domestic plumbing

occupation when an apprenticeship was not feasible or available. However, it is important to note that these adult students were not completely restricted to these courses and in some cases, they would be employed by the plumbing industry and referred to as apprentices.

The college-based qualifications that both apprentices and full-time students undertook were called technical certificates and these involved both practical and knowledge training in simulated college settings. Full-time students typically attended college two and a half days per week for one academic year to attain this technical certificate at level 2 or 3. It took up to two years for part-time students, who attended college for one day or two evenings per week. The colleges in this study encouraged level 2 students to find relevant employment before doing the level 3 technical certificate courses, which were usually run on a day-release basis. However, there was significantly more demand for level 2 courses, with only a very small number of unemployed adult students on the level 3 courses facilitated by the participating colleges in this study.

The other students involved in this study attended the college as part of apprentice and day-release schemes (one day per week for 'off-the-job' training). Unlike full-timers on college-based courses, these apprentices and adult students on day-release schemes worked four days per week with their plumbing employers in domestic and/or commercial settings. These students spent two years training at work for NVQ2 and sometimes a further one to two years training at work for NVQ3. During this time at work, NVQ candidates collected evidence of some of their work performance, described as 'competencies', in an NVQ assessment portfolio. The NVQ portfolio detailed the performance tasks to be completed at work and provided space for photographic evidence and corresponding signatures and witness testimonies. NVQ candidates were observed on at least two occasions by an external on-site assessor, who was usually employed by the college or training provider.

It was also the case that there was some flexibility in the routes these students took up in college. Full-time students doing technical certificates on preparatory courses in college could progress to the NVQ if they found employment. Alternatively, full-timers had the opportunity of starting up a business by going

self-employed, which allowed them to collect the evidence they required for the industry-recognised NVQ without the need for a plumbing employer or supervision in the work context. A college assessor would thus assume an on-site role in relation to the processing of the NVQ portfolio and assessment documentation.

## **1.2 Personal biography and rationale for undertaking this study**

My initial interests in this research stemmed from my own personal experiences as a self-employed plumber, a further education (FE) plumbing teacher and a student of education. This next section is a reflection on my own experiences in order to demonstrate how I first became interested in this topic and to reflexively account for my own particular world view, which has inevitably had an impact on the research undertaken for this project. I begin this account with some initial biographical detail and then move on to tell this story through three different lenses of identity (i.e. master plumber, plumbing teacher and student). These final three sections, concerning the three facets of my professional identity, are specifically used to highlight the key issues of concern leading to the undertaking of this study.

My story begins in the early eighties, at a time of both political and economic turmoil. This was when I left school in Bury, Greater Manchester. Bleasdale's (1982) grim television drama 'Boys from the Black Stuff' was a fitting backdrop to my graduation. The catchphrase of the time was 'Gizza job' (give us a job), which reflected the tough reality to which many working class people could relate. Jobs were scarce and the transition from school to work was becoming increasingly difficult for young people (Richardson, 2007). Over three million people were unemployed and opportunities for unskilled work were diminishing as Britain shifted from an industrial economy 'that makes things' to a knowledge and service economy 'that does things' (Council of Churches, 1999: 142). The industrial landscape was contracting along with the dream of material well-being to which the working classes had aspired in the relatively prosperous post-war era (Ainley, 2007).

After the rioting of 1981 in England, the government were keen to encourage unemployed youngsters into college or onto youth training schemes (YTS) in the form of traineeships or apprenticeships (Jessup, 1991). It was perhaps no accident that I found myself in full-time FE on a course I knew little about along with some of my equally bemused school peers. I was supported through the two-year construction technology course by my parents. However, it was different for my sisters, who went straight into mill, factory or childminding employment from school. Their wages contributed to the household income and for them, two years study at college supported by Mum and Dad was not really an option. My parents both worked at Bensons Toffees, based in Bury. They were working class but they had some understanding of the relationship between qualifications and social mobility. My father had attained his own City & Guilds in confectionery and had worked his way up to group general manager from starting as a sugar boiler, aged 15. Mum had been a supervisor trainer and could run most machines in the factory.

I was aware of my privilege in attending college and worked hard to achieve qualifications suitable for entry to the local polytechnic college. However, on leaving college in the early summer of 1984, I followed the love of my life to the southwest of England. My construction technician qualifications did not secure me the work I wanted, but I found work as a builder's labourer during the day and did bar work in the evenings. My labouring duties involved keeping two hectic plasterers constantly fuelled with materials in addition to keeping the site tidy and brewing tea. The plasterers were paid by the square metre and they covered it quickly, which kept me moving up and down swaying ladders and along sparsely-boarded scaffolding for most of the day. However, in the late summer of 1984, things changed and I was seconded to work with the father of my boss, Bill the plumber.

Apart from a brief spell as a stoker on reconnaissance boats during World War II, Bill had spent over forty years working as a plumber. Some referred to Bill as an 'old boy'. He spoke with a broad regional accent, which I often impersonated for fun. Bill had wild, frothing hair around a balding scalp, one tooth missing at the front and there was always a smouldering 'roll-up' hanging off his bottom lip. I warmed to Bill immediately and so too did his customers, who trusted his

gentle disposition, smiling face and his ability to fix almost anything. However, the early days of working with Bill were challenging because I was largely unsupervised and had to think for myself most of the time. I had not been socialised into practical work because my dad was a general manager and rarely attempted home maintenance; the exception being the time he mistakenly drilled through an electrical mains cable while fitting a tin opener to the wall. My early experiences with practical work were similarly precarious. I suffered electric shocks on a couple of occasions and had several minor injuries from falls and cuts from tools, as well as blisters on my hands from digging trenches for water mains.

In the evenings, I served cider and ale in the local pub and learned from the local patrons that there was a clear demarcation between craftsmen and labourers. I realised that without a craft qualification, I had little status. However, on applying to the local college for a course, they stated that, at 18, I was too old to do an apprenticeship and the block release courses only catered for trainees on a YTS at the time. While continuing to work for Bill, I persevered with the college applications and two years later, at the age of 20, I managed to get onto a day-release City & Guilds plumbing course. In today's flexible education market, it would probably be possible to enrol on a plumbing course the next day or at least be able to start with an online course.

My apprenticeship with Bill was not indentured (i.e. formally contractual) and I worked from week to week on a casual self-employed basis. This arrangement also meant that my off-the-job training was self-funded and I lost a day's pay for attending college one day per week. Therefore, my apprenticeship was not comparable to my apprentice and YTS peers, who were paid to attend college and did not have to pay their own tuition fees. However, unlike some of my peers, I was highly motivated in college because I needed to make it pay and it did. Indeed, the college training was valuable in opening up a new world of learning, which I did not often experience at work with Bill. The college day was equally divided into theory and practical, with the latter involving shop-skills such as welding and fabrication rather than the focus on the simulated plumbing installation exercises that exist now. The theory side mainly consisted of didactic classroom lectures and practising past paper questions for the multiple-



choice summative assessments. These exams were sat under invigilated conditions at the end of the three-year course in the case of the craft certificate. The advanced craft study followed for the next year and a half and this included written technical assignments, which were formative in nature and taken as students progressed through the course.

Bill was initially negative about my college attendance, stating that I would learn little that I could not learn at work, but he eventually became more positive about my new-found skills. He seemed to have a revival of energy in supervising me on contracts outside of his normal work scope, such as sheet-lead roofs and central heating contracts, which I completed with competence and gusto. However, after the first year in college, aged 21 and with three years of practical experience under my belt, I had already started to take on my own work and had made the break from Bill. Nonetheless, I continued with my college learning over the ensuing three years whilst running my own domestic plumbing business.

Formalised qualifications in plumbing took between three and five years, but shorter courses were available at the time for armed forces resettlement programmes, which usually lasted six months or less. One of the most popular stories in the pub concerned a six-month plumbing graduate called Len, who had mistakenly flooded the local Woolworths store causing untold damage to the store and his reputation. There was always a grin on someone's face when they talked about Len's plumbing. In the current milieu, those entering the trade through short courses are now referred to in the media as 'course cowboys' or 'fast-track plumbers' (Elliot, 2010). The locals in the pub viewed Len in a similar way, meaning that he had not gained their trust and respect. Len had made a common but forgivable plumbing mistake, but the route he had taken into the occupation had led to him being stigmatised as a 'cowboy' (i.e. not competent). In the eyes of some patrons, Len had not undertaken a recognised apprenticeship and was not perceived as a bona fide plumber.

I was 24 years old, married and had six years' plumbing experience by the time I graduated with my City & Guilds qualifications at craft and advanced craft levels. I could hear the distant voice of my father saying, 'I did a City & Guilds',

with his sentiments reflecting the high level of trust that working communities put in that particular awarding body and its qualifications at the time. By the age of 26, I had established a small business, employing an apprentice and sub-contract plumbers. I was also invited to teach on a part-time basis at the college by one of my former tutors.

I began my teaching career by taking a didactic stance, which reflected the practices of the lecturers I had experienced in FE. There appeared to be no complaints. I just produced and reproduced the pedagogy I knew, which seemed to meet the expectations of the students and management. The era of incorporation in FE, circa 1993, brought about a change whereby colleges became accountable for their own finances. This brought about management restructuring and contractual changes, which led to many teachers taking early retirement. This opened an opportunity for me to secure a full-time teaching post as a plumbing section leader for three years. However, the ongoing financial cutbacks following incorporation did not bode well for materially expensive vocational courses such as plumbing. With only a handful of apprentices and my plumbing section reduced to one small workshop, there were whispers of its closure.

I decided to go back to working as a full-time domestic plumber, but it was not long before a different college offered me part-time work as a plumbing lecturer during the evenings. This was a most fitting combination as my young family were growing up and teaching became a hobby that got me out of the house midweek to share my knowledge of a job that I enjoyed. Working as a practical plumber allowed me to keep up-to-date with the new technologies coming in from Europe, which were often accompanied with manufacturer training. In 2001, I was awarded master plumber status by the Institute of Plumbing (now the Chartered Institute of Plumbing and Heating Engineering) in partnership with the City & Guilds and the Worshipful Company of Plumbers. Although this voluntary award brought few, if any, benefits to my self-employed role as a domestic plumber, I hoped that my status as 'master' would help to inspire those I taught to progress and aspire to professional recognition. However, this was perhaps a rather romantic hope given the changes that were occurring in

both the plumbing industry and in plumbing-related vocational education and training.

In the years running up to the end of the first decade of the twenty-first century, a number of factors, occurring at roughly the same time, led to my undertaking this doctoral study. Although I had a basic City & Guilds qualification in FE teaching and an NVQ plumbing assessor award, I was encouraged by my college employer to gain a Certificate in Education. I achieved this and was inspired by the higher education tutors to progress onto the Bachelor of Arts Degree in education and training and then further to a Master of Science in educational research. This educational study, which related to my part-time teaching role and to my occupational role as a master plumber, helped me to identify several issues in plumbing training, which I believed warranted a more in-depth inquiry.

### **1.2.1 A self-employed plumber**

As a self-employed plumber, my initial interest in the research documented in this thesis was stimulated by my experience of competing with and finishing the jobs of other less qualified and less experienced plumbers. This led me to question how those new to the trade were being trained, how much on-the-job experience they had before they took up full-time employment and what sort of qualifications they were being awarded.

As a self-employed plumber, I was in constant employment and had a reasonably solvent business during the first two decades. My micro firm normally employed one qualified plumber and one apprentice. I generally carried out practical plumbing work on a daily basis with my other employees. It was usual for me to attend emergency call-outs in the late afternoons. This was an element of my job that I particularly enjoyed as it involved problem-solving, which required experience, skills and knowledge along with following hunches and using my intuition. However, it was becoming increasingly difficult to attain work and I was faced with lowering my prices considerably.

Despite giving detailed quotations stipulating compliance with relevant regulations, I was often undercut by cheaper workers, who were seemingly working legitimately, certified as 'gas registered' or as members of approved competent person schemes (CPS). These schemes involve the need for operatives to pass a competence qualification in college and, in the case of gas work, to register with a designatory body (Gas Safe). Such schemes are endorsed through Communities and Local Government (C&LG) and give competent people the ability to self-certify that their work complies with the building regulations, saving costs on local authority inspections or fees (C&LG, 2009). In addition to driving up quality, it was hoped that the CPS would promote training and competence in occupations associated with the building industry (C&LG, 2009).

However, regardless of the 'approved' branding of many of my competitors, I noticed from customer comments that I was often the second or third plumber to attend particular jobs. It was becoming common for customers to report that the previous plumber had charged a fee even though they had failed to fix the problem. In some cases, the plumber had attempted a repair incompetently, leaving damage and distress to the client. There were some instances where repair work was potentially dangerous, so I often filmed the faults with a video camera to show to my plumbing students as 'before and after' type job rectifications. Although the content of these repair videos were both engaging and amusing for my students, they reflected my particular growing concern with a type of culture that appeared to be emerging in the plumbing sector. This has been referred to as a situation where 'cowboy workers' are able to operate with relative ease (Fox in Hall, 2008: 16). According to Coffield (2004), this type of situation appears to be relatively unique to the UK where, unlike in neighbouring European countries, the British often place their trust in the free, unregulated and flexible market. As Winch (2002b) suggested, it is a culture worth exploring further because it appears that this kind of *laissez-faire* approach serves to increase the risk of poor-quality 'cowboy' work, which in turn diminishes the occupation's good public standing.

Of course, it could also be argued that flexible market approaches like these have resulted in economic benefits as they work to foster relatively high levels

of self-employment and job creation. This is something I was aware of in terms of my own experience because the chance of becoming self-employed at the beginning of my career provided me with work even in the unstable economic climate of the early 1980s. Indeed, it seems that the number of plumbers in self-employment has risen significantly over time. The Office for National Statistics (ONS, 2013a: 1), for example, stated that the 'number of workers who were self-employed in their main job rose 367,000 between 2008, the start of the economic downturn, and 2012'. In personal correspondence (ONS, 2013b) with those who undertook this study, I have since been told that there were 67,000 self-employed plumbers listed with the title 'plumbers and heating and ventilating engineers' at this time, which exceeds the 62,000 plumbers reported earlier by SummitSkills (2010a). These results show that there is a significant cohort of self-employed, 'one-man-band' businesses in the plumbing sector and signals the importance of exploring the training experiences of these people so that we might better understand the risks this poses to the profession due to a lack of proper registration and adequate work experience.

This risk has been identified by a number of groups. For example, it has been reflected upon in the evidence from the minutes of a Gas Industry Liaison Group (GILG) meeting, hosted by the gas SSC, Energy & Utility Skills (EUskills, 2009). With regard to entry into the 'licence to practice' scheme in the domestic gas sector, they stated:

*...we are all aware of the back door entrance into the industry...Why do we allow people into the industry with no formal qualifications...The key element missing and short cut is real work experience and [a participant] asked how trainees could possibly be deemed as competent without this vital element. In many of the current development routes the link between employment, training and qualifications has been broken (EUskills, 2009: 1).*

Indeed, in England, the competency qualifications for CPS associated with domestic plumbing, gas, oil and electrics do not require apprenticeship and, in most cases, they do not require sustained types of work experience under the supervision of a qualified mentor. The GILG (EUskills, 2009) comments suggest

that the notion of competence in a safety-specific occupation such as gas installation without a candidate's access to real work experience is highly questionable. Some, like Kleiner (2000), have argued that certification through improved processes of education and training with the addition of continuing professional development (CPD) is what is needed now and is what will ensure a better sign of quality. However, Kleiner (2000: 192) was also quick to point out that the empirical evidence on these issues was 'thin or non-existent'. In part, my study seeks to redress this gap and to ask some important questions about the training, qualifications and work experience that new plumbers receive prior to entry into the occupation.

### **1.2.2 A FE plumbing tutor**

With regard to my experiences as a FE plumbing tutor, my interest in this research arose as a result of witnessing some interesting problems in relation to the supply and demand for apprentices and trainees in the plumbing occupation. In the period 2003 to 2005, my own small plumbing firm was receiving an increasing number of job applications from 16- to 19-year-olds as well as adult students requesting work experience so that they could finish their NVQ qualification. In relation to this, the table below outlines the number of plumbers entering such courses between 2005 and 2010 and serves to highlight the differences between this supply and the actual demand:

Table 1.1 Actual numbers of plumbing students compared to predicted demand (National Aims Report, 2012; Experian/Hammond in SummitSkills, 2010b: 16).

Dates	Numbers of students on plumbing related courses each year (2005–2010)	Average annual demand for plumbers, gas and heating & ventilation predicted in England (2005–2010)
2005–2006	43,850	4,433
2006–2007	46,320	4,433
2007–2008	44,310	4,433
2008–2009	45,480	4,433
2009–2010	40,960	4,433
	Total 220,920	Total 22,165

Table 1.1 shows that the publicly-funded supply of 220,920 plumbing-related courses (at levels 1 to 3) from 2005 to 2010 (National Aims Report, 2012) was approximately ten times the predicted demand for 22,165 plumbers (including gas and heating and ventilation) during that period. It should also be noted that this tenfold difference between supply and demand did not take into account plumbing students who were self-funding their own training through private providers. This additional number is reflected in the 48,000 students who completed level 2 technical certificates in plumbing in 2007, which is greater than the numbers shown in the table (City & Guilds, 2008a).

Furthermore, the Learning and Skills Council 2004/5 reported cumulative starts to April 2005 as 8,598 for plumbing apprentices (in Fuller and Unwin, 2006b: 51), which was nearly double the SummitSkills's predicted need for 2006. This significant oversupply in the plumbing sector was reported by Dickin (2007: 1) of the Association of Plumbing and Heating Contractors (APHC) in an article that warned that there was 'trouble ahead as oversupply hits home'. He stated that the economic slowdown in the plumbing sector was 'mainly because so many newly qualified plumbers and also plumbers from other European countries have entered the industry' (Dickin, 2007: 1).

Although double the number of apprentices were recruited into the plumbing industry in 2005 than were predicted would be needed for 2006, Experian/Hammond (in SummitSkills, 2010b: 17) forecast that the demand for apprenticeships would not be met for the period 2006 to 2010:

*It is not expected that the average annual requirement 2006-2010 will be satisfied by the recruitment of apprentices to building services engineering.*

To address this predicted shortfall in the sector, Experian/Hammond (in SummitSkills 2010b: 17) suggested that other sources of recruitment may include 'individuals changing career, those returning to the sector and those leaving military service'. SummitSkills (2010b) were suggesting that there were predicted job opportunities for those seeking routes other than apprenticeships into the BSE sector for the period 2006 to 2010.

During this time, several newspaper stories and social media websites also reported on perceived opportunities occurring in the plumbing sector. In one case, the Advertising Standards Authority (ASA) (2006) upheld a complaint against a training provider called OLCI, which delivered recognised City & Guilds qualifications and associated training, for misleading claims made in the national press regarding plumbers' earnings and career opportunities:

*"TAP INTO A TOP CAREER". Below, text stated "The demand for plumbers continues to soar - and qualified men and women are able to command increasingly high salaries. The Construction Industry Training Board predicts a national shortage of 32,000 qualified plumbers by 2008. With this massive demand, average hourly earnings can be as much as £130 an hour in the South East...." (ASA, 2006: 1).*

A complaint to the ASA contested the hourly rate of £130 an hour and the complaint was upheld. Moreover, the ASA (2006: 1) adjudication document reported that OLCI's advertisement 'was likely to mislead' and breached 'clauses 3.1 (substantiation), 7.1 (truthfulness) and 52.2 (employment and business opportunities)'.



*The Guardian* newspaper (Elliot, 2010) also ran a story with the headline ‘Are fast-track plumbing courses just money down the drain?’. The article reported on a training provider who claimed, ‘The country is in dire need of qualified plumbers’ and quoted a former trainee who ‘never takes home less than £1,200 per week’ (Elliot, 2010). However, earnings for plumbers are reported by SummitSkills (2010a) as generally much lower than this, with first-year plumbing apprentices starting on around £10,000, newly-qualified plumbers earning around £17,000 and experienced workers earning around £30,000 per year.

Despite the SummitSkills (2010b)'s forecast of skills shortages for the period 2006 to 2010, they (SummitSkills, 2010a) reported that ‘Currently, there are insufficient job opportunities available to satisfy demand’. Nevertheless, in spite of the lack of job opportunities, it seems that the message stuck and plumbing was perceived by many as a well-paid trade that was always in demand. With regard to college-based plumbing courses, Unite (2012: 14) expressed a deep concern ‘that in 2011 the Association of Colleges, against the position of the industry and its SSC, SummitSkills, successfully lobbied the Department for Education to retain the delivery’ of the ‘non work based, non economically viable courses in Building Services Engineering’. Such non work-based courses described by Unite include technical certificates in plumbing, which are featured in this study. In their statement below, Unite (2012: 10) captured some of the sentiment of my own growing health and safety concerns, both as a self-employed plumber and as a plumbing teacher:

*...in regard to full-time college courses, youngsters are being sold a pipedream on where the course will lead, as at course completion their experience and competence is not fit for purpose to industry. This raises serious safety concerns, not least the creation of significantly under qualified individuals, who have the misconception that they are then able to undertake safety critical work (the installation and maintenance of gas, water and electrical systems, often in domestic premises, putting the general public in danger for instance). This is in stark contrast to what is achieved via a bona fide industry recognised apprenticeship, which*

*delivers a competent and qualified operative at the end the program*  
(Unite, 2012: 10).

Unite (2012: 14) reported that traditional apprenticeships were being undermined by full-time, college-based training processes. Reflecting my own anecdotal experiences, Unite (2012) argued that existing qualified workers and apprentices were competing for jobs with unregulated, underqualified or non-qualified operatives, who undercut competent and qualified individuals working in the same field. Most importantly, Unite (2012) suggested that the general public were being put at risk in terms of their health and safety.

From my own perspective, I am both pragmatic and reflexive in acknowledging that times are changing and some of my opinions about apprenticeships may be regarded as traditional, flawed and self-interested in protecting my status as a master plumber. However, given my own route into the occupation of plumbing, which was hardly a conventional type of apprenticeship, I welcome safe and competent routes into occupations by means other than apprenticeships. In this sense, different routes into occupations may be equally as valid as the bona fide apprenticeships, described above by Unite (2012: 10). It is the purpose of this research to explore this diversity of provision in order to better understand it, both in terms of student experience and tutor perception. This exploration will better inform us about these options and may help us to assess whether Unite's (2012) description of more traditional apprenticeships as being gold-plated and of high value is fair. It may also result in alternative routes being considered less positively or favourably.

### **1.2.3 A student of education**

The third facet of my vocational identity that led to my interest in, and my undertaking of, this study concerns my learning as a student of education and training. Indeed, many of the issues central to this study relate to my own experiences as both an undergraduate and postgraduate student in education. These were problems that I was aware of (e.g. in relation to vocational education) but, until this point, my opinions had been anecdotal rather than empirically evidenced.

My academic study has been particularly important in helping me to understand the wider contextual issues associated with the history of failed youth training schemes and apprenticeship programmes running up to end of the twentieth century. As a result of the reports constructed by Steedman, Gospel and Ryan (1998: 7), I became aware of the need to address growing youth unemployment problems by advocating high-quality preparatory training and expansion in the number of apprenticeships.

Steedman, Gospel and Ryan (1998: 7) drew my attention to the 'serious skill shortages and enduring skills gaps at the skilled crafts, technician and associate professional level'. They argued that skills shortages had macro consequences for the economy as a whole in 'contributing to wage inflation and making macro-economic policy management more difficult by pushing up wages and lowering productivity growth in the longer term' (Steedman, Gospel and Ryan, 1998: 7). The strategy that they drafted aimed to address 'inflationary wage pressures' (Steedman, Gospel and Ryan, 1998: 14) caused by skills shortages in sectors such as construction by exploiting the potential of apprenticeships. They proposed that increasing the number of apprenticeships would contribute to the nation's stock of intermediate qualifications and, in turn, increase productivity, lowering youth unemployment and deflating craft wages to reduce the risk of macro inflation in the wider economy.

Such an economic rationale for exploiting the concept of apprenticeship seems to demonstrate to me how contemporary apprenticeships might be bound up with various demands of capital (Rikowski, 1999). Rikowski (1999) suggested that education and training were generally becoming subject to economic aims, which were reflected in policy statements and strategies. Coffield (2004: 284-285) describes such socio-economic policies that perceive growth in skills and qualifications as 'a monocausal prescription for economic success', which is encapsulated by the economic aims of the Leitch Review of Skills (2006). Ball (2008: 149) pointed out, 'the increasing subordination of the education to the economic' and the rendering of education itself into a commodity form suggests that 'educational provision is itself increasingly made susceptible to profit'.

Therefore, educational processes play their part in the creation of the enterprise

culture and the cultivation of enterprising subjects' reflected strategies, such as the 'Qualify with a Business' strategy operating in FE (Ball, 2008; BIS, 2009).

Such concerns expressed by these academics about the market for educational products are reflected in the way that plumbing training was often promoted and advertised. The City & Guilds (2011: 1) 'Rich List', which is associated with the encouragement of apprenticeships and vocational education, is an appropriate example:

*The list reinforces the principle that vocational learning is a gateway to wealth regardless of a learner's background.*

This list consists of a relatively small selection of very successful and high-earning celebrities who were former apprentices. However, rather than apprenticeships being a gateway to wealth, the strategy for growth (Steedman, Gospel and Ryan, 1998) sought to reduce craft wage inflation in such sectors as construction by increasing the number of apprentices. Steedman, Gospel and Ryan (1998: 13) proposed 'limiting apprentice pay' to 'reduce the costs of training to employers and facilitate the offer of more places'. A decade later, the Department for Innovation, Universities and Skills (DIUS) and the Department for Children, Schools and Families (DCSF) implemented a different strategy to increase the number of apprenticeships. The DIUS/DCFS (2008: 38) stated, 'we believe that there is scope for moderate growth in Apprenticeship numbers by offering similar direct payment incentives to large companies, so that they can recruit more Apprentices than they need'. Such growth policies in the era of the Labour Government up to the end of Gordon Brown's premiership were described by Fuller and Unwin (2011b: 191) as focused on 'the more qualifications awarded, the more apprenticeship places created, the better'.

Reflecting my own experiences discussed in this introductory chapter, a quantity over quality approach to plumbing training seemed to have been developing. As a plumbing teacher, I was subject to a system of 'bums on seats' in relation to full-time plumbing training for youths and enterprising adults seeking self-employment. This was juxtaposed alongside unbridled apprenticeship growth through the government-funded oversupply of

apprentices in a declining economy. Hence, I became aware that the opportunities for the development of apprentices' wealth promoted by City & Guilds (2011) were at risk of being compromised. In this case, implicit and explicit promises of wealth within preparatory types of training and apprenticeship associated with plumbing ran the risk of 'breach of trust' if basic opportunities for employment failed to materialise (Winch, 2002b: 109).

Steedman (2011) suggested that Labour (1997–2010) and the present Coalition government both prioritised their policy aims for apprenticeships differently, with Labour focusing on social inclusion by increasing the number of apprenticeships and the Coalition focussing on using apprenticeships to generate higher skills. However, achieving these two outcomes simultaneously in order to shape apprenticeship policy has proved difficult (Steedman, 2011). In order to address the growing problem of young people not in education, employment or training (NEET), Labour policy circa 2008 aimed to expand apprenticeship places to 400,000 by 2010/11 with an additional 30,000 places for adults aged over 25 (Fuller and Unwin, 2008; Lanning, 2011). In relation to the Coalition's conception of 'higher skills', the notion of quality in regard to apprenticeships has historically been ill-defined and there has been a lack of consensus as to how this is characterised. The Labour government (1997–2010) emphasised 'completion rates' in apprenticeships, which they considered to be 'a mechanism for driving up the quality of delivery and recruitment in the system' (DIUS/DCSF, 2008: 13). According to the Learning and Skills Council (LSC) (2009: 15), apprenticeship completions were judged by Labour to be the product of the quality of 'inputs' into the process, with the outcome conceived as fully trained and employed former apprentices. The LSC was established in 2001, replacing the previous Training and Enterprise Councils (TECs) and Further Education Funding Council (in Rainbird 2006: 24). The LSC had responsibility for the funding of post-sixteen learning (excluding universities) and operated in a top-down approach, setting a national framework for the management of resources through local LSCs. The types of inputs, processes and outcomes in relation to successful apprenticeship completions were reported by the LSC (2009: 39) to include:

## Inputs

- Apprentice capability (e.g. qualifications on entry, initial motivation and aptitude)
- Employer commitment (e.g. willingness to take on obligations of apprenticeship training)
- Training provider capability (e.g. capacity to deliver well-designed courses)

## Processes

- Management of the apprenticeship (e.g. being able to validate accreditation of prior learning exemptions)
- Academic support (e.g. assisting the apprentice to meet the key skills requirement)
- Pastoral support (e.g. assisting with the transition from school to work)
- Framework structure and delivery (e.g. flexibility, design, progression routes)
- Structure of funding (e.g. how much funding is held back for completion)

## Outcomes

- Continued employment (i.e. is continued employment in workplace conditional to completing?)
- 'Licence to practice' (i.e. is there a *de facto* licence to practice in sector or occupation linked to completing apprenticeship?)
- Progression (e.g. is there a clear progression route from level 2 to 3 and beyond through either the company or the education system?)

Other factors affecting apprenticeship completion were listed by LSC (2009: 39) as including labour demand (e.g. excess labour demand increases competition for would-be apprentices), training supply (e.g. strong competitive training market drives up quality and by implication completion rates), and sectoral specificities (e.g. whether there is a tradition of apprenticeship training and accompanying support networks and infrastructure). In this apprenticeship scheme, retention and achievement on the programme are recorded in the Individual Learner Record (ILR), which provides a comprehensive record of

students' personal characteristics and their learning activities (type, funding, completions, etc.). However, in regard to the IRL, the LSC (2009: 24) reported that, 'there is little information about the employers of apprentices or the quality of training and none about the labour market context', which are key areas of interest for my own study.

Reflecting on my own values as a master plumber and plumbing teacher and being located within the English labour market context for nearly three decades, I had experienced the gradual erosion of my occupational status. Being a master craftsman and plumbing teacher had little if any social standing in relation to others working as 'plumbers' in the field. I had witnessed first-hand the growing problem of poor quality workmanship, which I considered to be linked to a general lowering of professional standards and lack of regulations in regard to the formation of new plumbing businesses. It seemed as though the plumbing profession was a 'free-for-all', undergoing de-skilling to cater for greater flexibility in qualifications for enterprise, which could be conveniently taught and assessed in college contexts rather than the workplace. These perceptions and experiences led me to particularly focus on the quality of plumbing training.

Moving beyond my own position, it is important to consider the diverse ways in which 'quality' is perceived and understood by wider stakeholders in the plumbing profession and apprenticeships in general. Perceptions of quality include those of the Trade Union Congress (TUC), which is a body that represents unions in England and Wales. While the TUC acknowledges social inclusion and completions as important indicators of apprenticeship quality, its member unions also endorse the need for further measures in order to achieve high-quality apprenticeships (Grindrod and Murray, 2011). The TUC strategy (see Grindrod and Murray, 2011) seeks regulation and the setting of some minimum standards to improve apprenticeship quality, which was also the case for the changes specified by the Office for Standards in Education, Children's Services and Skills (Ofsted) (2012). Collectively, these standards address some issues of quality regarding the teaching and learning experiences of apprentices. In relation to this, Fuller and Unwin (2008) proposed locating apprenticeships within a new 'Vocational Educational Paradigm', involving

integrated on- and off-the-job curricula and pedagogies, which are key aspects of apprenticeship quality and which are explored in depth in this thesis.

In addition to off-the-job training, apprenticeship standards include employment status for apprentices, specification of minimum apprenticeship duration, opportunities for progression to level 3, greater enforcement of equality of access to apprenticeships, training that builds on existing skills and quality-assuring assessment (TUC in Grindrod and Murray, 2011; Ofsted, 2012). Steedman (in Grindrod and Murray, 2011) reports that, unlike apprenticeships in other countries, which take three years to complete, the average duration of all apprenticeships in England is between one and two years, with some taking less than one year. Although the Coalition government strategy document 'Skills for Sustainable Growth' (BIS, 2010: 14) made a pledge to 'reshape Apprenticeships so level 3 becomes the level to which learners and employers aspire', level 3 is not mandatory. Alternatively, Keep and James (2011: 57) advocated Scotland's approach in aligning the minimum standard of apprenticeship provision with level 3 qualifications. According to Keep and James (2011: 57), Scotland's apprenticeship stakeholders were able 'to build up the prestige and status of apprenticeship provision and to help associate it with high-quality, intermediate level training'.

Other comparisons reveal that overseas apprenticeships 'are built upon conceptions of skill and occupational identity, and forms of work organisation and job design that are more or less wholly absent here' (Keep and James, 2011: 61). For example, while a minority of English apprenticeships may provide qualification progression to honours degree courses for those seeking management promotions, there appears to be a lack of equivalent courses for occupational workers leading to master awards, which the Germans hold in high esteem (Keep and James, 2011). For workers wishing to excel at occupational and technician level and beyond, the German 'meister' status combines extensive technical job knowledge with wide practical skills and was a rank above journeyman status and two ranks above an apprentice. In Germany, both masters and journeymen are members of the regional Chamber of Crafts, which register both businesses and apprentices, hold master craftsman exams and issue corresponding diplomas and certificates. Keep and James (2011) argued



strongly for the incorporation of journeyman and master progression within our apprenticeship programmes as an alternative to management routes. It was suggested by Keep and James (2011: 53) that 'higher level and advanced apprenticeships, focussed on these skills and moderated by effective Sector Skills Councils, could be the best route to this goal'.

However, some of my own anecdotal experiences of the SSCs associated with plumbing are reflected in the comments of Fuller and Unwin (2011a: 38), who argue that in terms of apprenticeships, English 'employers, SSCs and providers tend to fulfil minimum requirements'. They (Fuller and Unwin, 2011a: 38) describe the 'contracting culture' of English apprenticeships, which are state-driven and have a primary focus on targets and political goals. However, despite the SSCs' patchy performance in regard to apprenticeships, Doel (2011: 54) maintains that SSCs have the chance to become the guarantors of quality in the same way that the German Chamber of Crafts is. For this to be realised in practice, Fuller and Unwin (2008: 20) argue that government, providers, sector bodies and employers together 'would have to agree to a shared concept of what counts as a quality apprenticeship for organisations, individuals and society'.

As a master plumber, plumbing teacher and student of education, I had a hunch that there would be implications for full-time students' and apprentices' learning and opportunities for progression resulting from the unbridled promotion of apprenticeships in parallel with the growing enterprise of unapprenticed routes into the occupation of plumbing. This study provides me with the means to fully explore this hunch and to develop my initial interests further, which incorporate my concerns about the quality of training for the plumbing profession and about ethicality in terms of the promises made to new recruits.

### **1.3 Exploratory pilot and qualification consultation events**

In order to follow up my initial interests, I began this study with a period of exploratory pilot research. This work included attendance at some sector qualification events in order to learn more about these qualifications and the wider socio-political context in which they existed together with observation of

plumbing apprentices in one college and one work context. This exploratory pilot also helped me to understand more about the variety of provision available for trainees, decide on a context, group and set of students for the final study, and to focus my attention on the issues that tutors and students were themselves concerned with.

Some of my observations during this time, which helped to develop the focus for my later project, included the following:

- At the SummitSkills employer qualification consultation events, only one plumbing employer attended in contrast to the large number of plumbing lecturers in attendance.
- At these qualification consultation events, there was a general sentiment, communicated anecdotally by the plumbing tutors, that the decisions about the organisation and content of plumbing qualifications had already been decided elsewhere. It appeared to those attending the meetings that SummitSkills had failed to create the impression that wider stakeholders, which included educators, small employers and the self-employed, were involved in the design of employer-led qualifications.
- Tutors appeared to use these opportunities to voice their general concerns about the existing plumbing qualifications and issues relating to the high number of students on preparatory plumbing courses. These included their concerns about difficulties in teaching full-timers in relation to electrical and gas safety and in making meaning in relation to the theoretical content they taught.
- Tutors were vocal about the online assessments, which they felt were often fragmented and confusing for students (i.e. not enabling them to develop a full understanding of issues).

These initial observations were useful in helping me design the final empirical research presented in this thesis. This pilot work not only helped to refine my

research questions, but also my understanding of the wider socio-political context and my awareness of the language used by tutors and students to express their views on this subject. This work could further our understanding of vocational and apprentice-based education, training and assessment in relation to occupations like plumbing, which have tended to be overlooked.

#### **1.4 Conclusion and outline of the structure of the thesis**

My story, as told here, expresses the fact that I was growing increasingly concerned, as a master plumber, about the quality of workmanship I was encountering and, as a plumbing teacher, about the supply and demand of apprentice plumbers in relation to public safety and the reputation of the occupation. Moreover, as a plumbing teacher and student of education, I felt some responsibility for the courses I was involved in teaching. At the point at which I embarked on my research, I had reached a stage where I felt that I could no longer just stand by and watch all of this happen around me. This research is very much a product of all of these initial concerns, experiences and hunches. Of course, I was, and I remain, aware of the fact that I experienced these issues in a particular way, at a particular time and in a particular context. I am also aware that my own experiences and those of the few people I observed in the pilot study are not necessarily representative of the views of the majority working or training in this occupational field, but are rather those of a select group who are interested in gathering to discuss these issues. The findings of this study are not necessarily representative because I have not sought a random sample group, which might have been representative of the wider population, but have carried out my research in a more localised, detailed and empirical manner. Nevertheless, the experiences above have spurred me on to further explore these issues.

In this final section of the chapter, I will provide an overview of the structure of this thesis:

- **Chapter 2** presents the literature review for this study. This includes a synthesis and review of the key theoretical papers and empirical studies relevant to my research aims. Reviewing these studies allowed gaps to

be identified for my own study. In addition, other sources of literature were consulted, such as government-sponsored reports and reviews along with positional papers and publications relevant to the plumbing and heating sector. The literature review shaped the research questions listed in the concluding section of this chapter.

- **Chapter 3** presents the research methodology and design of this study, which is qualitative in its exploration and interpretation of tutor and student perceptions of full-time plumbing courses and apprenticeships. The methodological approach described in this chapter has elements of an ethnographic approach. The chapter also outlines the methods used for the empirical study, including observation and semi-structured interviews undertaken in work contexts and at three FE Colleges, named in this thesis as College 1 (C1), College 2 (C2) and College 3 (C3). Chapter 3 also discusses the thematic approach I adopted for the analysis of the data and my chosen means of representing this data in the thesis.
- **Chapter 4** sets out the ethnographic findings in relation to the participants' family, work, education and employment backgrounds. This chapter also focuses on the student and tutor stories about the routes that they took to enter the plumbing occupation. This chapter seeks to set the scene for the subsequent chapters, which more explicitly address and respond to my research questions. In the discussion section at the end of this chapter and at the end of each of the subsequent findings chapters (Chapters 5, 6 and 7), I reflect briefly on how government policy may have shaped, informed and constrained the experiences of the tutors and students in my study.
- **Chapters 5, 6 and 7** present the findings in relation to the main research questions. These chapters focus on what the tutors and the students have to say about the divide between theory and practice in plumbing education and training, the type and nature of assessments and the work experience that was available. The discussion sections that follow the

reporting of the research findings in these chapters, relate to the wider empirical research literature, while also providing a brief account of relevant government policy at the end.

- **Chapter 8** presents the conclusions drawn from the discussions and the implications for policy and practice along with recommendations for further research.

## **2 Literature review**

### **2.1 Introduction**

This chapter reviews the literature relevant to my study of full-time college courses and apprenticeships in plumbing. Eraut (2004: 201-202) contended that 'current approaches to professional and vocational learning are impossible to understand without knowledge of their various traditions, histories and cultures'. Therefore, the first section of this review presents a brief history of apprenticeships in England from the guild apprenticeships of the twelfth century through to the voluntary apprenticeships of the current day. The emergence of the National Vocational Qualifications (NVQs) in the late twentieth century is discussed as part of this historical overview. NVQs had the dual role of facilitating alternative routes into occupations through preparatory types of college training while also being the defining outcome of contemporary apprenticeships. The evolution of NVQs as the key means of testing occupational competence is explored in this chapter.

My own experiences, together with the insights gained from the exploratory pilot study that I undertook, signalled the need to investigate in more detail the teaching and learning of plumbing in both college and work contexts in respect of the relationship between theory and practice in the plumbing curriculum and the forms of assessment currently in place. In this chapter, I draw on evidence from empirical studies relating to apprenticeships and to teaching, learning and assessment in FE colleges in order to inform my own understanding of the issues and to identify where gaps in knowledge in the field exist. My review of the literature led to the identification of the research sub-questions that shaped the design of my study. These are presented at the end of this chapter.

### **2.2 An overview of apprenticeships**

#### **2.2.1 The foundation and development of apprenticeships**

An apprenticeship is generally understood as a means of occupational learning under qualified supervision, involving sustained periods of knowledge and skill

formation in the work context (Snell, 1996; Gospel, 1998; Fuller and Unwin, 2008). Webb (1999: 101) stated that the term 'apprenticeship' was derived from the word 'apprehension', meaning 'laying hold of' and 'seizing with the mind', which is fitting for the occupation of plumbing, which requires both practical hands-on skills and cognitive knowledge to achieve competent performance.

Snell (1996) reported that, historically, English apprenticeships could be generalised in terms of three distinct periods: the guild apprenticeship from about the twelfth century to 1563, the Elizabethan statutory apprenticeship from 1563 to 1814 and the voluntary apprenticeship from 1814 to the present (Snell, 1996: 303). The first, the guild apprenticeship, included both manual and professional pursuits, although both historical and conceptual notions of apprenticeship are usually associated with practical types of work (Snell, 1996; Aldrich, 1999). The Guilds System was enforced by both custom and law and by the fourteenth century, was applied to a range of occupations, including plumbing. The Worshipful Company of Plumbers, which exists today as one of London's ancient livery companies, can be traced back to the year in which its ordinances were drawn up by the Guild of Plumbers in 1365 (Watson, 2005: 9). In these historical times, competency, workmanship and the lawful undertaking of trade were given high priority, stipulating:

*...the competency of a plumber shall be certified by assent of the best and most skilled men in the trade, testifying that he knows how well and lawfully to work, and to do his work so that his trade may not be scandalised or the commonality damaged or deceived by folk who do not know their trade (Watson, 2005: 9).*

The attenuation of the ancient guild apprenticeship system came with introduction of the Elizabethan statutes of artificers in 1563, which represented Snell's (1996) second historical period of apprenticeship. This brought the granting of the Royal Charter to the Worshipful Company of Plumbers in 1611 for the benefit of good and honest craftsmen, thereby creating a disadvantage for workers who were deceitful and dishonest (Watson, 2005). Statutes gave the Worshipful Company protection and the right to fine those plumbers working in or around London who had not served a seven-year apprenticeship (Watson,

2005). Therefore, in Elizabethan times, serving an apprenticeship had explicit virtue that demarked honest craftsmen from those who were unapprenticed and sometimes deemed as unlawful and dishonest. In current times, apprenticeship is not explicitly demarked from other routes into the occupation, but the Chartered Institute of Plumbing and Heating Engineering (CIPHE), which is the professional body for plumbing, aims to protect public health by keeping a (voluntary) register of qualified plumbers.

The Elizabethan statutes involved a range of social, legal, settlement, welfare and administrative considerations, which were integrated within the apprentices' craft learning and practice (Snell, 1996). According to Aldrich (1999: 21), settlement may be understood as 'the right to receive welfare at the hands of the parish', but it was also a complex and important concept in relation to apprenticeships (Snell, 1996). A sense of family and social belonging was bound up with settlement, which was essential to craft apprenticeship learning. There was a fine balance to be struck between the supply and demand of labour in order to protect the quality of local workmanship from unapprenticed workers while negating the need to import more expensive forms of foreign labour (Snell, 1996: 307, 311). For this reason, restrictions on the ratio of apprentices to journeymen (competent plumbers) existed and each master with three apprentices was duty-bound to keep one journeyman in order to prevent the exploitation of apprentices as cheap child labour (Gospel, 1995; Clarke, 1999; Aldrich, 1999; Hawkins, 2008; Fuller and Unwin, 2008).

Unlike the basic contractual agreements drawn up between employers and apprentices in modern times, indentures were a key feature of Elizabethan apprenticeships providing protection to both employers and apprentices. Indentures featured the terms and conditions of employment that served to qualify apprentices for a legal settlement entitlement within a parish community (Snell, 1996: 308). From the masters' perspective, the indenture helped to prevent the poaching of apprentices by those artisans who were reluctant to train their own (Snell, 1996: 307). The exercise of craft or trade was regulated and the length of time served by apprentices was commonly stated as seven years, but it was invariably between five and nine and not exceeding the age of 24 (Snell, 1996: 308; Gospel, 1998; Aldrich, 1999). Such specified and



mandatory periods of time-serving at work over several years in apprenticeships have now given way to unspecified periods of the work experience required to allow students to present the necessary competence for qualification assessments. This is an important aspect of my own study in relation to students' supervision in learning and their development of skills, knowledge and competence over time, which may include college training during or prior to their participation in work. Therefore, the importance of work experience, the time spent learning and the types of supervision and guidance apprentices and students receive are issues explored further in this study.

The abandonment of indentures and the withdrawal of supervision by masters came about in Snell's (1996) third historical period of voluntary apprenticeship, beginning in 1814. This period brought the repeal of the Elizabethan statutes of artificers and the State's relinquishment of responsibility in the matter of apprenticeships. Aldrich (1999: 17) suggested that the nature of apprenticeship was undermined at this stage in history, which largely came about through industrialisation 'for which little skill or training was required'. Nevertheless, many of the original concepts and practices of apprenticeship survived into the new industrial era with new occupations such as engineering, iron shipbuilding and printing (Aldrich, 1999). However, the darker side of apprenticeship, involving exploitation, was also a characteristic of this early nineteenth-century milieu (Fuller and Unwin, 2008). Young people were dispatched from various parts of England to the industrial areas to work in factories, mills and mines, which were described by Aldrich (1999: 17) as 'having an insatiable appetite for child labour'. Apprentices were fed, clothed and housed, but they were worked very hard without training or the hope of advancement. Employers were mainly concerned with procuring cheap labour and had little interest in teaching apprentices a trade or mastery of skills. At the end of the time-serving period, apprentices found themselves supplanted by the next batch of young workers (Aldrich, 1999). In other words, apprentices had lost their rights to settlement and the implicit promise of employment, which is not unlike the situation faced by contemporary apprentices, who compete for employment with unapprenticed labour.

During the period following World War II, unlike Germany and France, Britain had comparatively poor levels of technical education despite many apprentices receiving off-the-job training and access to City & Guilds exams (Gospel, 1998; Steedman, 1998; Aldrich, 1999; Barnett, 2004; Hammond, 2005; Evans, 2006). By the late 1960s, there were growing concerns about the effectiveness of apprenticeship training because it was perceived as exclusive, restrictive, male-dominated and still relied on time-serving rather than meeting performance outcomes or standards (Gospel, 1995, 1998; Fuller and Unwin, 2004a; DIUS/DCSF, 2008; Rudd et al, 2008). In order to address these issues, a Conservative government in the latter part of the twentieth century introduced NVQs as the key outcome of both apprenticeships and flexible types of unapprenticed routes into occupations — these are discussed further in the next section (Gospel, 1998; Green, 1999; Munro and Senker, 2006; Ainley, 2007).

The key difference between the historical apprenticeships reviewed in this section and the current Modern Apprenticeships (MA), discussed later in the chapter, relates to the introduction of NVQs as *the* recognised outcome of apprenticeships.

## **2.2.2 National vocational qualifications**

NVQs were introduced in the UK in 1986 and were derived from methodologies used by the North American ‘competency movement’, which informed the construction of the functional analysis method for vocational qualifications (Jessup, 1991; Jones and Moore, 1995), coordinated by the Manpower Services Commission (MSC). This approach formed the basis of the Youth Opportunities Programme (YOP) and the Youth Training Scheme (YTS), which both preceded the introduction of NVQs (Jones and Moore, 1995). Although the NVQ model has undergone many changes, they are still used in the UK (Field, 1995; Young, 2011). Jessup was the original architect of NVQs, which Young (2011: 259) described over two decades later as ‘the most widely known, widely copied and most heavily criticised model for a vocational qualifications framework in the world’. I will draw here extensively on aspects of Jessup’s (1991) doctrine in order to understand the changes to NVQs over time in relation to the original designs and intentions for qualification framework. I will

examine how and why knowledge and competence were intended to be taught, learned, assessed and related to one another in both college and work contexts.

It is important from the outset to understand the contested issues in regard to the introduction of NVQs, which were viewed by civil servants, educationalists and industrialists at the time of their inception as revolutionary (Wolf, 1995). Wolf (1995) described the proponents of competence-based education (CBE), such as Jessup (1991), as believing that all formal learning would be more effective in providing a means for individuals to realise their potential while enabling the country to better utilise its resources. The supporters of NVQs claimed the awards were instrumental in recognising competence and capability in the application of knowledge and skills and that they brought flexibility to occupational training while serving to break the rigidities of time-serving in the labour market (Field, 1995; Gospel, 1998). In contrast to the vocational qualifications in Germany, which were designed by employers' associations, regional governments, trade unions and educationalists, 'NVQs were designed by civil servants in consultation with employers and were intended to meet the needs of employers' (Grugulis, 2002: 18). In relation to this approach, Jones and Moore (1995: 85) questioned the imperial role of employers in the design of NVQs:

*...in a period of radical labour market change, deregulation and the dismantling of the Welfare State, the assumption that the employers' point of view is transparent (i.e. a simple representation of what is empirically the case) is meaningful only within the neo-liberal ideological fiction that the "free" market is somehow "natural" and its effects intrinsically reasonable and just.*

Jones and Moore (1995: 85) argued that employers' interests were 'transparent' and served 'at the expense of rendering opaque the point of view, the experiences and interests of workers in general and the various groups (defined by the intersections of class, sex, age, ethnicity, qualification level, region, whether fully employed, casualised or unemployed) that make up the work force'.

The rationale for NVQs was also influenced by a need for greater institutional accountability, and it was proposed that this would be better achieved through competence-based qualifications. NVQs were viewed both as a means of up-skilling the working population and as a way for those skills to be measured' (Grugulis, 2002: 3). Commenting on this, Jones and Moore (1995: 85) suggested, 'the neo-liberal, market model, translated into competency methodology, is essentially a form of cost-accounting that manages public expenditure by providing a measure for the market costing of provision'. Hence, there was 'a substantial shift towards tighter central government control through the introduction of a "quasi-market", a punitive external inspection regime and funding mechanisms linked to student recruitment, retention and the achievement of qualifications' (Lloyd and Payne, 2012: 3). NVQs became instrumental in measuring the effectiveness of training providers as well as the performance of students undertaking courses (Munro and Senker, 2006). Consequently, it was argued by Jones and Moore (1995) that the competency movement and its methodology facilitated the commodification of education and the transfer of control away from professionals such as teachers and craft workers to managers.

Given the managerial discourse surrounding NVQs, Wolf (1995: 128) reported the stark opposition to competency approaches voiced by some English and Australian writers, who considered them as potentially catastrophic and disastrous. She highlighted the 'extreme' resistance to the 'competency crusade' exemplified by Smithers (cited in Wolf, 1995: 128), who contended that the National Council for Vocational Qualifications (NCVQ) were 'perpetrating a disaster of epic proportions'. Writing in 1993, the study by Smithers (in Grugulis, 2002: 6) contrasts the old City & Guilds plumbing certificate with the plumbing NVQ, illustrating the dramatic differences between the two qualifications. He argued that the City & Guilds required a higher level of practical and technical expertise and tested knowledge of physics, electronics, maths, technical drawing and technology, while its NVQ replacement specified none of these requirements (Smithers in Grugulis, 2002: 6-7).

In relation to the occupation of plumbing, the sector's current lead body, Summitskills, which represents employer stakeholders, undertook a decisive

role in developing and defining the occupational standards of NVQs (consisting of elements of competence and performance criteria). It was assumed that the occupational standards set out by employers would lead to a unifying concept for all learning through the development of learning programmes, which directly addressed the requirements as defined by the NVQ (Ertl, 2006). However, this assumption was challenged by Eraut (1994: 15) who stated that 'important aspects of professional competence and expertise cannot be represented in propositional form and embedded in a publicly accessible knowledge base', such as the national occupational standards for NVQs. In addition, despite the perceived support for NVQs by industry sectors, Grugulis (2002: 9) reported that most employers considered the NVQ process as cumbersome and bureaucratic (Grugulis, 2002: 9). Moreover, Raggatt's (1994: 69) study reported a 'lack of interest in NVQs by employers and doubts about employers' expertise in delivering the necessary workplace assessment.

However, NVQs were not wholly reliant on employers. They were promoted as flexible and able to respond to the changing landscape of unemployment, employment and self-employment with training and assessment both on- and off-the-job, while also providing progression routes for individuals to learn at different levels. The 'radical reform' behind the NVQ system called for a new framework of training and enterprise for both young people and adults (Burke 1989: 2). In addition, NVQs offered something different to the existing educational practices, where a significant minority of school leavers 'did not even acquire the basic skills for employment in relatively "unskilled" work' (Jessup, 1991: 5; Field, 1995; Munro and Senker, 2006). NVQs implied the provision of opportunities for students to learn and 'operate in real work environments to standards set by industry, and to allow students to progress at their own pace' (Hyland, 1994: 237). Furthermore, the NVQ was originally designed as a progressive framework that could be adopted across diverse occupational sectors with levels ranging from 1 to 3 for occupations, 4 to 5 for junior and senior management and professional levels at 6, 7 and 8, equivalent to degree, masters and doctorates respectively (Stanton and Bailey, 2004; Ertl, 2006). Despite these apparent qualities and advantages over previous occupational qualifications, however, NVQs were often criticised for being too narrow, concerned only with the performance of simple tasks and questionable

in respect of their adequacy in providing a foundation for progression to higher level qualifications (Raggatt, 1994).

Jessup (1991: 15) defined the NVQ as a 'statement of competence clearly relevant to work and intended to facilitate entry into, or progression in, employment and further learning, issued to an individual by a recognized awarding body'. However, the notion of competency in relation to NVQs was seen by some academics as a form of job analysis located within the scientific management tradition, set in a wider behaviourist psychological paradigm (Hyland, 1993; Jones and Moore, 1995). Hodkinson (1992: 31) was critical of the dominance of 'role performance' (a composite of skills, knowledge and understanding) in NVQs, where the relationship between knowledge, understanding and performance is seen as linear and unproblematic, in other words if someone has the 'right' skills, knowledge and understanding, they will give the 'right' performance'. Hodkinson (1992) suggested that assessment of performance is assumed to be straightforward, indicating the implicit positivism underpinning NVQs (signified by the assumption that the central role competence plays in NVQs can be objectively discovered, defined and measured). In this sense, Jessup (1991: 15) was adamant that the 'NVQ certificate is a statement of competence of what an individual has achieved'. In short, the NVQ was seen as evidence that someone could do the job in a particular occupational sector as opposed to merely having passed a college course (Stanton and Bailey, 2004). However, Hodkinson (1992) questioned the relevance of statements of competence in NVQs and described the nature of the occupational role in NVQs as contested and dependent on the context in which it is placed. He wrote, for example, 'not every car mechanic or hairdresser recognises the descriptions of their job found in the elements of competence drawn up by lead industry bodies and it is common for employer and worker to see the same role differently' (Hodkinson, 1992: 32).

Hodkinson (1992: 30) was critical of behaviouristic approaches to competence, but he identified the value of 'role performance as one important component of vocational education and training', which he described as an 'interactive model' of competence. It is important to note that Jessup (1991: 27) was also keen to emphasise the social dimensions of occupational performance through

'increased demands for demonstrations of competence in the workplace in order to collect valid evidence for assessment'. He was specific about the 'need for work experience to be a valid component of most training which leads to occupational competence' (Jessup, 1991: 27). Hodkinson (1992: 30) recognised the necessity of work experience within his interactive model of competence. He described the potential benefits to a competence based approach in 'moving the emphasis in vocational learning out of the classroom and into the working environment' (Hodkinson 1992: 36). This locates NVQ training and competence within an interactive social paradigm of everyday life, which is often overlooked by academics who narrowly locate Jessup's (1991) NVQs and corresponding notions of competence within a purely behaviouristic model.

Indeed, Hyland (1994: 239-240) was supportive of Hodkinson's view in that 'what you learn cannot be separated from the activity you are engaged in while learning, or from the context or culture in which the learning takes place'. According to Hyland (1994: 239-240), Hodkinson was right in stressing 'the importance of learning as a "dialectical process" and identifies the crucial role of "schemas", mental representation of sets of categories which play an indispensable role in the development of learning, providing the foundation for the vital interaction between the learner and the learned'. Hodkinson's (1992) interactive view of competence chimes with the sentiments of Ashworth and Saxton (1990: 15) who argued:

*In sum, any skill or knowledge is part of a person's 'lived world', it gains its meaning partly from the context in which it is learned. It is an error to regard the competence as an isolated mental capacity, divorced from the lived environment. The problem of transfer from one context to another is not likely to be solved merely by assessing knowledge and skill in terms of competence.*

The original NVQ was outcome-led and assessed against performance criteria relating to relevant national occupational standards, so a separate teaching syllabus or curriculum was not necessarily required (Jessup, 1991; Green, 1995; Ertl, 2006). Jessup (1991: 11) asserted that the framework of standards provided the 'reference grid within which different forms of learning provision

can be related'. The learning objectives were specified in the form of outcomes or standards, independently of context or any course, programme or mode of learning. Indeed, Munro and Senker (2006: 137) argued that 'central to the design of NVQs was the decision to separate assessment from learning'. However, it is acceptable to say that this is what transpired, but it is important to note that this is not what Jessup (1991) originally intended for NVQs.

One of the key strengths of Jessup's (1991: 125) doctrine was his intention that the NVQ model should be conceived in terms of the close integration of practice and theory. He stated that the NVQ model would enable assessment of knowledge in respect of each element, relevant to practice. He asserted that 'simply to assess (and teach) [elements] separately will fail to make the links between theory and practice which are so crucial for competent performance' (Jessup, 1991: 125). Jessup (1991: 122) further argued that:

1. *Knowledge is required, in the context of practising an occupation or profession, not as an end in itself, but to ensure competent performance*
2. *Knowledge is required to facilitate transfer of skills*

Jessup (1991) believed that it was critically important that learners were able to draw upon and relate the relevant aspects of knowledge when presented with problems and situations in their professional or occupational role. He (1991: 126) stated that 'when the body of knowledge is taught separately from the practice of a profession it tends to become an end itself, developing its own structure and priorities, with the result that it does not necessarily relate closely to practice'. The relationship between taught 'knowledge' in college contexts and the 'competence' practice of plumbing was a key area of interest in my study.

It is important to note, for the purposes of the study reported in this thesis, that although work experience was a central feature of the original NVQ as specified by Jessup (1991), other forms of simulated training were deemed acceptable provided that national occupational standards were met by candidates in the assessment process. Simulations were described by Rush et al (2010) as



situations made to resemble occupational practice as closely as possible for the purpose of teaching, learning and assessment. However, others argued that competence in relation to plumbing was more than the ability to meet prescribed occupational standards; it was also the ability to deal with unexpected events and situations, which may occur in the processes of work (Eraut, 1994; Biesta and Berbules, 2003; Crawford, 2009). In relation to this, Ashworth and Saxton (1990: 14-15) found that qualification learning does not always readily transfer from college to 'real life' and that it often does not reflect employers' needs. They (1990: 14-15) suggested that 'despite the link of the notion of "transferable skill" to competence, there is no evidence that all the things for which people can get credit are actually transferable to contexts other than the situation in which the competence was measured'. Hence, there are limitations to measuring competence in NVQs through the process of assessments in simulated college environments. This will be reviewed further in the following sections. As discussed in the next section, NVQs were nevertheless set to become the outcome qualifications of the Modern Apprenticeships, introduced in the 1990s.

### **2.2.3 Modern apprenticeships and preparatory training in further education**

MAs were launched by the Conservative government in 1993 as a response to concerns about the UK's international ranking in terms of intermediate skill levels (Gospel, 1998; Fuller and Unwin, 2008). In order to meet the demands of high skills provision, MAs included key skills for literacy, numeracy and communication and were intended to be set apart from the previous YTSs, which were often perceived as lacking in quality (Fuller and Unwin, 2008; Brockman, Clarke and Winch, 2010). However, despite positive evaluations in the early stages, there was variable quality in MAs across sectors, which was a cause for concern. According to Ryan and Unwin (2001: 104), MAs were 'introduced without any parliamentary debate on the reform of an institution whose antecedents stretch back centuries'. Highlighting some of the weaknesses of MAs, Fuller and Unwin (2008) described some European approaches, which included legislation to ensure periods of time-serving, the presence of qualified trainers at work and guaranteed off-the-job study. The

varying quality in MAs was related to the fact that some employers limited their apprentices to on-the-job learning. In contrast, MAs associated with off-the-job training were highly prized, very selective and led to well-paid careers (Fuller and Unwin, 2008).

The work-based nature and focus of NVQs as the outcome of MAs implied an over-reliance on embedded know-how and work knowledge, which was described by Green (in Keep and Payne, 2004: 59) as encouraging 'an Anglo-Saxon "practical man" approach to skill that tends to neglect the importance of underpinning knowledge and theory'. The utilitarian nature of NVQs arguably neglected the candidates' technical articulation of the 'how' or 'why' aspects of learning. In addressing these qualification-related issues, the review of apprenticeships, led by Sir John Cassels in 2001, highlighted 'the inadequacy of the competence-based NVQs in developing apprentices' vocational knowledge' (Hayes and Kelly, 2007: 14). Consequently, technical certificates were introduced with the intention of providing off-the-job subject knowledge elements to supplement the skills and competence developed in the workplace. The Institute of Directors (in Bynner, 2011: 18) stated that the technical certificate:

*...really does add both to the balance and also to the apprentice's opportunity for progression at a later date, because you are building in both the underpinning technical knowledge as well as the on-the-job competence skills. As a general theory it is good to protect that as a feature of our apprenticeship because it is very much a feature of continental apprenticeships.*

#### **2.2.4 A 'low skills equilibrium' and the need for 'high skills'**

Despite the introduction of technical certificates and a renewed interest in the promotion of apprenticeships, Finegold and Soskice (in Coffield, 2004: 285) reported that the evidence associated with vocational education and training suggested that the UK was run on a 'low skills equilibrium' owing to a combination of market failures (e.g. poaching of skilled workers, poor information on the benefits of training and poorly trained managers and

workers) and government failures (e.g. under-investment in education and training and a plethora of poorly designed interventions). Felstead (in Coffield, 2004) argued that the low skills equilibrium was possibly due to the significant lack of demand for intermediate qualifications from employers at level 3, which Coffield (2004: 286) attributed to the poor quality of jobs in many vocational sectors. Keep and Payne (2004: 61) suggested that the uptake of a 'high performance' workplace model had been extremely limited in the UK. Moreover, Dench et al (in Keep and Payne, 2004: 64) stated that 'in reality most employers simply want people to get on with their job and not challenge things'. Therefore, the UK's approach to vocational education and apprenticeship has arguably perpetuated the production and reproduction of a low skills equilibrium in comparison with many of our European partners (Winch, 2002a: 110-111; Munro and Senker, 2006: 123; Lanning, 2011: 9).

With regard to the focus of my own study, the *Skills for Growth* White Paper (BIS, 2009) drew attention to the lack of technician status in occupational roles concerned with intermediate technical skills in the UK population. This was reflected in the labour force survey of 2010, which reported a total of 189,000 plumbers and heating and ventilating engineers with only 12% of all 'science, engineering and technology' technicians in employment (Mason, 2012: 9). Despite the large uptake of publicly-funded plumbing courses during the period 2005 to 2010, reported in chapter one, the CIPHE (2013b) indicated that the average age of a qualified craftsman in the plumbing industry who had attained S/NVQ Level 3 was between 45 and 55. This situation was reported more widely by Layard and Steedman (in BIS, 2013: 54), who stated that 'England is the only country where apprenticeships at Level 2 far outnumber those offered at Level 3'. Therefore, the low level uptake of intermediate and technician level status qualifications in plumbing reflected the low skills equilibrium across the BSE sector and the wider economy.

In order to move towards a high-performance model, viewed by consecutive governments as central to economic growth, the sustained promotion of high-quality apprenticeships and vocational training has been perceived by many to be central to the economic growth and development of the UK in line with other modern economies (Winch, 2002a; Hayes in Wolf, 2011; Gurría in Lloyd and

Payne, 2012). The type of language used by contemporary vocational institutions explicitly promotes this high-performance approach. The Institute for Learning (IfL) (2011: 4), for example, 'supports excellence in professional practice' and the Institute for Public Policy Research (in Dolphin and Lanning 2011: 47) is 'Supporting excellence: Creating more and better apprenticeships'. Despite the low-level uptake of intermediate qualifications in plumbing, the CIPHE (2013a) stated they have a duty and responsibility regarding 'the promotion of the highest levels of plumbing and heating excellence'.

This reference to 'excellence' is related to a need in the UK to adopt a high skills equilibrium to provide both social and economic benefits through the well-being achieved as a result of the combination of increased levels of training and the economic production of high-quality goods and services (Winch, 2002a: 110). Reflecting this need for high skills in vocational education and training, Fuller and Unwin (2012: 8) presented an apprenticeship framework to provide a platform for higher learning and career progression:

*...the extent to which apprentices are given access to (new) knowledge and skills and recognised vocational qualifications and to structured on- and off-the job training. Other critical factors include the degree to which apprenticeships incorporate the opportunity to learn about the whole work process rather than only discrete tasks, and provide a platform for higher learning and career progression.*

Fuller and Unwin (2003, 2004b, 2006a, 2008, 2011a, 2012) described apprentices' opportunities and barriers to learning through their expansive-restrictive continuum. They suggested that those apprenticeships located at the expansive end of their continuum provide structured off-the-job learning opportunities for progression and boundary crossing to new occupational communities. However, those apprenticeships located at the restrictive end of their continuum may be solely work-based, repetitive and only provide the skills that employers require for production. Fuller and Unwin (2003) called for apprentices' potential to be met through the process of high-quality apprenticeships, which, in turn, might also expand the horizons of employing organisations (Fuller and Unwin, 2011a). However, in their promotion of

expansive regimes, Fuller and Unwin (2011a) did not condemn restrictive apprenticeships but wrote that, at best, they give apprentices employment-related skills and nationally recognised qualifications. Some of the expansive qualities required of apprentices in a high skills equilibrium can be identified within aspects of Fuller and Unwin's (2004c: 39) empirical study:

*Stephen is a self motivated and capable young man who gained good educational qualifications at school, and resisted the opportunity to go to university in favour of entering the labour market via an apprenticeship.*

Apprentices were described in Fuller and Unwin's (2003: 415) study as participating in the company's 'apprenticeship association', taking part in charity fundraising and visiting local schools to talk to pupils about engineering and the apprenticeship route and promotion of apprenticeships'.

### **2.2.5 Esteem issues for vocational education and training**

In contrast to the high performance approach reflected by Fuller and Unwin's (2003) motivated and academically capable apprentices, Stevenson (in Education International, 2009: 6) suggested that 'wherever one looks, the place for the vocational seems to be similar':

*...the vocational is at the bottom of a hierarchy of knowledge and value, it is a stream of learning available to the 'lower achiever'... it is legitimised solely in industrial and other utilitarian terms rather than in the connections among different kinds of meaning making, and it is preserved for occupations of lower status.*

The Wolf Review (2011: 7) was scathing about the quality of most vocational education:

*The staple offer for between a quarter and a third of the post-16 cohort is a diet of low-level vocational qualifications, most of which have little to no labour market value. Among 16 to 19 year olds, the Review estimates*

*that at least 350,000 get little to no benefit from the post-16 education system.*

Wolf's view was echoed by Lloyd and Payne (2012: 3) who described the FE sector in England and Wales as operating on a 'deficit model of provision' for vocational students and those who struggled at school. However, there is evidence that vocational education can be of good quality and provide pathways into employment. Haynes (2008) conducted a national questionnaire survey of secondary headteachers' experiences and perceptions of vocational courses for year 10 and 11 students across 12 secondary schools in two different regions of England. She found that 'the less able, disaffected and disengaged young people were those being targeted for NVQs' (Haynes, 2008: 344). Her findings also showed that vocational courses were perceived by over half of headteachers in the survey as a means of re-engaging disaffected and disengaged young people with learning. However, Haynes (2008) found improvements in student motivation attributed to the vocational relevance of the courses and the adult ethos of the learning site, where courses were taught jointly with colleges and training providers. Furthermore, over half of students taking vocational courses had been reported by the majority of headteachers as continuing with post-16 education and/or training rather than becoming just another 'NEET' (Not in Education, Employment or Training) (Haynes, 2008).

Brockmann (2010) studied motor vehicle apprentices in Germany and England, focusing mainly on the latter. She used an ethnographic case study design involving four apprentices per course, per country (a total of 16). The methodology centred on a style of interviewing that aimed to encourage young people to tell their life stories with minimal intervention from the researcher. This was complemented by two-day observations at each of the colleges and workplaces in the study with follow-up interviews conducted some eight months later. Brockmann (2010) argued that England had a prevailing learning culture that appeared to perpetuate stereotypical views of learners in vocational education and training (VET) based on their open rejection of the teaching and learning of theory. Brockmann (2010) explained that young people's rejection of academic style learning was often equated with a rejection of all learning and especially that concerned with theoretical types of knowledge. She asserted

that the English education system prioritised academic education while marginalising VET and attached little value to experiential learning.

Taylor and Freeman's (2011) study in Canada of youth attitudes towards apprenticeship training used interview and survey data from former high school apprentices in two trades. They argued that the high schools' construction of youth as either 'hands-on' or 'book learners' and youth apprentices' strong self-identification as 'hands-on' learners 'works against the goal of developing theoretically applied learning' (Taylor and Freeman, 2011: 359). They suggested a need for youths to gain access to a variety of learning opportunities and expansive learning communities. However, this appeared to be more difficult for non-traditional entrants to trades (e.g. females in male-dominated occupations) and working-class youths given their greater dependence for learning on the goodwill of employers and work-based role models. Taylor and Freeman (2011: 360) suggested that more communication between schools, training providers, unions and employers would be helpful 'with the goal of integrating formal and informal learning and developing more structured training plans for apprentices'.

The studies above have highlighted some key issues for my own study to explore: the types of student enrolling on plumbing courses or taking up apprenticeships and their motivations for doing so; their areas of potential strength and weaknesses in relation to the theory and practice elements of the curriculum; and the relationship between college- and work-based learning. In the next section, I explore in more detail the college-based occupational pathway and issues associated with knowledge and skills transfer.

### **2.3 The relationship between theory and practice**

This section deals with issues relating to the organisation of plumbing qualifications, which separately specify knowledge and competence in terms of theory and practice respectively. Jessup's (1991) original doctrine for NVQs specified the integration of theory and practice. However, the introduction of a separate body of knowledge in the technical certificate for NVQs brought with it a separation of the theory in the classroom in relation to the practical elements

of the qualification, performed in the college workshop or workplace. In relation to this, Eraut (2004: 220) argued that separating 'theory and practice components over time and space militates against their integration'. Winch (2006) suggested that where integration was weak and theory was learned separately from practice, then it should be actively applied to practice. He argued that 'when this is done successfully, the practice of the technique gains much of its sense from prior instruction in the theory' (Winch, 2006: 421). Moreover, Fuller et al (2005) argued that it was not so much that the apprentices simply brought skills and transferred them into a new location, but that prior learning had helped to construct the whole person that arrived. In this sense, prior theoretical training in college may contribute to a student's tacit or generic skills, such as their developing confidence in confronting a job without feeling they have been thrown in at the deep end to sink or swim.

In keeping with the relational approach to theory and practice, one of the few vocational practitioner studies of electronics apprenticeships was undertaken by Monks (2010). He emphasised the importance of relating theory to apprentices' current and future work experience in order to maintain their motivation in learning. As a college lecturer, he used a 'single-cycle action research methodology' utilising 'adapted problem-based learning (PBL) practical exercises to address the disengagement of apprentices with the existing assembly-style electronic laboratory programme' (Monks, 2010: 455). He argued that unless tangible relevance was established, the need to pass exams became the key motivator and course material was simply viewed by students as a collection of abstract concepts, which led to surface learning (Monks, 2010). While working as a lecturer, Monks (2010) was struck by the enthusiasm often displayed by students for hands-on types of learning, which he believed to stem from an underlying preference in learning style, common amongst those choosing apprenticeships and practical courses. Monks (2010) argued that the accumulation of meaningful work experience during an apprentice's four-year course and exposure to real environments placed extra significance on the content of the off-the-job modules to be equally relevant and meaningful. The work of Von Treuer, McHardy and Earl (2013) suggested that to encourage trainee motivation, the relevance and utility of the training programme should be



emphasised. They advocated the implementation of strategies aimed at promoting organisational commitment to the design and delivery of training.

However, in relation to the UK's Advanced Apprenticeship Programme (AAP), which is relevant to my study, Guile and Okumoto (2007) argued that forms of vocational practice, which combined the knowledge, skill and judgment that employers required, were difficult to develop. Their paper compared and contrasted the AAP with the Technical Apprenticeship, developed by Birmingham Repertory Theatre, with regard to the different notions of skill formation, skill transfer and employability. Research was carried out over a two-year period and methods included 1:1 semi-structured interviews with six apprentices, six heads of department and the project coordinator plus group interviews with apprentices and the heads of department. Apprentices were also observed in the workplace. Guile and Okumoto (2007: 571) argued that the 'concept of vocational practice conceives of judgement as the outcome of the mediated relation between concepts, reasons and practice, thus implying the need for an iterative relation between the teaching and learning curriculum'.

In the case of NVQs, students' opportunities to apply or transfer theoretical knowledge learned in a school context to a practical situation elsewhere is often assumed to happen, but it may not in reality. In their study of competence-based learning in the Netherlands, Biemans et al (2009) raised concerns about relevance and the relation between vocational education and professional practice. These are both issues of interest in my own study. Biemans et al (2009) contended that vocational school learning appeared to be difficult to integrate with learning in the workplace. They argued that 'learning activities performed by individual students in different places at different times should be aligned with each other' (Biemans et al, 2009: 281), such as reflection in school on training tasks performed at work. Moreover, they reported insufficient connectivity between students' school assignments, workplace training tasks and competence-based assessments, creating a lack of continuity throughout their learning pathways. Biemans et al (2009) stated that Dutch vocational institutions had made considerable efforts to design, develop and implement competence-based learning activities and assessments on job situations in

order to make the necessary connections between learning and assessment in school and in the workplace.

Developing relationships between college-based simulated curriculum and the workplace assumptions about knowledge transfer between contexts concerns the nature of simulated training in regard to students' opportunities and abilities to apply their learning in the workplace. Fuller and Unwin (2003: 415) provided a useful empirical example of apprentices applying the knowledge and skills they had learned in college in the process of their performance at work:

*...this is a good department for apprentices to come to after their year at college because it replicates some of the features of the college workshop and, therefore, provides apprentices with the opportunity to apply the knowledge and skills they have acquired off-the-job in the workplace setting.*

Fuller and Unwin's (2003) example shows how apprentices were able to learn in a college workshop and then transfer knowledge and skills to the workplace setting. Here, knowledge and skills transfer was assisted by the replication of the simulated college training in relation to the activities apprentices were undertaking at work.

In relation to the college replication of workplace training, Rush et al (2010) undertook an evaluative research project investigating the use of simulation in nursing education in England. They used a mixed-method case-study approach, collecting data from questionnaires, focus groups, field diaries, digital recordings and participant and non-participant observation of simulations. Rush et al (2010: 469) identified two approaches to simulation: 'low-fidelity' and 'high-fidelity'. Fidelity is concerned with the levels of authenticity of simulations or the extent to which simulations 'mirror the reality of practice' (Rush et al, 2010: 469). In relation to the practical aspects of plumbing, for example, computer or screen-based simulations may be described as low-fidelity because they are less faithful to the physical skill requirements of the actual job (Rush et al, 2010: 469). In addition, computer simulations do not allow for the human interactions found in other forms of high-fidelity simulated activities, such as the one earlier

exemplified by Fuller and Unwin (2003: 415). High-fidelity simulation promotes a high degree replication of the work context, which includes human interactions found in occupations such as nursing and plumbing and where simulations may include working with high-level technology, realistic modelling or client role play situations.

In regard to theory and practice knowledge and skills transfer between different contexts, Jessup (1991: 122) suggested that NVQs make 'assumptions about skill transfer, in order to decide what inferences to draw about performance in other contexts, from evidence of competence presented in the first context':

*One factor which would seem significant to skill transfer is the variation in performance required between contexts. If, for example, the function specified by an element of competence could be achieved by applying the same procedure, irrespective of context, transfer between contexts might reasonably be assumed. If, on the other hand variations between contexts resulted in significant variation in performance requirements then transfer would not be a straightforward matter (Jessup, 1991: 122).*

Therefore, in relation to knowledge and skills transfer, there are issues of fidelity between different contexts and possible variations in performance requirements that may ensue. In order to accommodate significant variation in performance requirements, Jessup (1991: 26) aimed to foster a broad understanding of occupational competence for NVQs:

*A person who is described as competent in an occupation or profession is considered to have a repertoire of skills, knowledge and understanding which he or she can apply in a range of contexts and organisations. To say that a person is competent in a 'job', on the other hand, may mean that their competence is limited to a particular role in a particular company.*

Jessup (1991) was specific about the need for work experience in different contexts and organisations to allow candidates to modify their performance accordingly, which had implications for the way in which learning and

assessment should be facilitated in terms of occupational competence. In keeping with Jessup's (1991) position, some of the vocational literature suggested that knowledge transfer between theory and practice activities undertaken at college in relation to activities performed at work were not always straightforward. Tanggaard's (2007: 461) empirical study of Danish apprentices, which has currency in the English milieu, suggested that 'general school subjects taught in trade vocational school cannot be applied directly in the work place'. Moreover, Eraut (2004: 220) did not consider the application of theory in practice as a simple process and raised the important question of 'how much further learning is required in order to transfer theoretical knowledge from an academic setting into an occupational practice'. He introduced the metaphor of the iceberg, describing explicit knowledge codified in books as the ice above the surface and below, the further learning required to convert that codified knowledge into personal knowledge, which is ready for use across the range of possible contexts (Eraut, 2004: 220).

At this juncture, the concepts of 'low-road and high-road knowledge and skills transfer', formulated by Perkins and Salomon (in Rush et al, 2010: 471), are helpful. Low-road transfer occurs when simulated training conditions in a prior context are similar to those in a new context, for example in the case of a car driver renting a small van. Even though there is a slight difference in the driving task, a similar and previously-learned driving response is evoked and driving the van becomes almost automatic to the car driver. Fuller and Unwin's (2003) earlier example may be described as high-fidelity between contexts with low-road knowledge and skills transfer because there was little variation in performance requirements. High-road transfer, however, 'depends on deliberate abstraction from contexts of previous learning or application with a deliberate search for connections' (Perkins and Salomon in Rush et al, 2010: 471). This requires mental effort on the part of the learner, for example 'where a person new to politics but familiar with playing chess might carry over the chess principle of control of the centre of the board, pondering what it would mean to control the political centre' (Perkins and Salomon in Rush et al, 2010: 471). Such high-road transfer may also apply to problem-solving and dealing with novel and unexpected problems in plumbing. It can be argued that, although plumbing involves many aspects of low-road transfer (e.g. jointing pipes on 'dry'

simulated training systems in college that are similar to some characteristics of plumbing in the workplace), the occupation also requires apprentices to deal with significant variations in performance requirements (e.g. water in pipes in real-world activities requiring isolation of supplies, draining, refilling and commissioning of old/worn-out systems along with issues of inconvenience and meeting variations in customer requirements depending on contexts). These sometimes require high-road types of skills and knowledge transfer, drawing on past experiences of previous workplace events.

Jessup (1991: 33) suggested that a key part of the original intention for the NVQs was to capture some of the novelty associated with performing in the work context:

*When unexpected circumstances occur the procedures are often not appropriate or not sufficient and the performer must improvise to achieve success. Coping with the unexpected is a crucial part of the concept of competence we are trying to foster (Jessup, 1991: 33).*

In regard to the unexpected, Keep and Payne (2004: 58) were deeply sceptical as to whether a generic skill of problem-solving could be taught. They argued that, while it is reasonable to claim that some aspects of vocational training policy might accommodate simplistic forms of problem-solving or analytical reasoning, 'it would be unwise to assume that we could simply transfer this ability to the problems presented by a broken-down car' (Keep and Payne, 2004: 58).

In summary, the key argument emerging from the literature discussed in this section is that theoretical learning must be related to practical learning in college and in the workplace. This is supported by Jessup's (1991) intention for the integration of theory and practice and reflected in the studies of both Guile and Okumoto (2007) and Biemans et al (2009), who called for iterative relationships between theory and practice and continuity of theory and practice throughout students' learning pathways. The study undertaken by Monks (2010) also pointed out the need for meaningful work experience, exposure to real environments and the importance for the content of the off-the-job modules to

be equally relevant and meaningful. Rush et al (2010) suggested that high-fidelity simulations may also improve learning in college contexts in relation to providing conditions to help students transfer knowledge to work settings. However, this is not a straightforward matter and my study will explore how teaching and learning in relation to the theory and practice of plumbing are organised in relation to providing optimum conditions for students' learning. The next section discusses previous studies of vocational and apprenticeship teaching and learning.

## **2.4 Teaching and learning**

Owing to the split nature of the college-based City & Guilds technical certificate in plumbing and the corresponding workplace NVQ, the literature in this section is divided into two main parts. The first section focuses on teaching and learning in the college context while the second focuses on teaching and learning in the workplace.

### **2.4.1 College teaching and learning**

England, like other European countries, such as Denmark and the Netherlands, now has a predominantly college-based system of preparatory training for entry into the plumbing industry, which has emerged alongside apprenticeships. In relation to this, Dewey's (1938: 47) early twentieth century theories still have currency in that he considered educational preparation to be a 'treacherous idea'. He thought it wrong to suppose that the mere acquisition of knowledge and skills would automatically constitute preparation for their effective use under conditions that were very dissimilar to those in which they had been acquired. Dewey (in Biesta and Burbules, 2003: 86) suggested that 'knowing and acting are necessarily related' and argued against the separation of theory — where knowledge is acquired independently of activities — and the isolation of practice as a domain where knowledge is applied. For Dewey (in Biesta and Burbules, 2003: 45), knowledge was associated with a combination of action and reflection. Here, reflection may be understood as looking back at what has been done in order to extract the meanings that provide the substance for 'intelligent dealing with further experiences' (Dewey, 1938: 87). Such deliberate

abstraction from the contexts of previous learning and the search for connections to solve new problems relates to the high-road concept of skills transfer (Perkins and Salomon in Rush et al, 2010). Therefore, the meaningful primary experience is of key importance and Dewey (1938) linked this with action.

In regard to students making meaning from practical events in learning, Dewey (1916: 110) argued that an 'ounce of experience is better than a ton of theory simply because it is only in experience that any theory has vital and verifiable significance'. In Dewey's (1897) pedagogical creed, he asserted that the active side precedes the passive in the development of pupil nature. He (Dewey, 1897: 13) argued that 'conscious states tend to project themselves in action'. Therefore, 'knowing' reveals itself at the level of action before it reveals itself in symbolic forms, such as language. For Dewey (1916, 1938), the notion of attaining a deep and meaningful understanding of theory without experience was a difficult undertaking. Contemporary writers, such as Eraut (1994: 160), have also suggested that the cognitive approach to learning knowledge prior to having practical experience raises 'difficult and disturbing questions about the relationship between depth of understanding and long-term performance'.

Oakeshott (in Eraut, 1994: 42) described propositional knowledge as codified, meaning it could be learned through language in conversation and books. In the teaching of propositional knowledge, Dewey (1938: 45) argued that teachers had responsibilities to understand the needs and capacities of their students and that it was not enough for tutors to repeat teaching methods that had proved effective with other individuals at other times. Dewey (1938: 45) highlighted inherent problems with the teaching of knowledge to students irrespective of their 'powers and purposes'. In this sense, he (1916: 110) argued that teachers might often assume that a student's mind was able to grasp and apprehend 'if it will only give attention, and that this attention may be given at will irrespective of the situation'. In support of Dewey's concern for the needs of students, the empirical studies reviewed above suggested that contemporary vocational students were often inclined towards practical types of preparatory learning and that such students may be unresponsive to academic styles of learning (Haynes, 2008; Brockmann, 2010; Taylor and Freeman, 2011).

With regard to curriculum and pedagogy, Guile's (2011) article is relevant to my study of plumbing apprenticeships and full-time courses as preparatory training for students entering the trade, including those moving from other occupational areas. He drew on a case study of the design of a Foundation Degree in aircraft engineering, which was explicitly designed to support the formation of new entrants and the reformation of career switchers. Guile (2011: 454) problematised the notion of 'transfer' while acknowledging 'the contribution that the embodiment of knowledge and skill and the constitution of occupational identity make to vocational performance'. However, he asserted that the constitutive role of the teaching and learning curriculum had been taken for granted. Its role was one in 'which: (1) different forms of knowledge are identified, combined and sequenced in a vocational teaching curriculum; (2) lecturers and workplace supervisors devise pedagogic processes to assist learners to engage with these forms of knowledge in educational and workplace contexts; and (3) learners embody and then use these forms of knowledge to support theoretical and practical reasoning in educational and workplace contexts' (Guile, 2011: 454).

Guile's (2011) three vocational goals of continuity of curriculum, mediation of learning and embodiment of skills in practice are especially important to my own study. This is in terms of the majority of cohorts of full-timers and career switchers who rely on the tutors in college to relate aspects of theory and practice in the vocational curriculum. However, in relation to apprenticeship, Guile's (2011) pedagogical recommendations imply the weakness of college-based approaches, which arguably lack the same opportunities as apprenticeship for students to embody their learning in the process of authentic work activities.

Guile (2011) argued that, instead of viewing teaching and learning curricula as different, it is essential to consider their relation to one another. In order to achieve this, Guile (2011: 455) used the concept of 'recontextualisation' to highlight the way in which a concept changes as:



1. those involved in constructing a vocational teaching curriculum move a concept from its disciplinary origins to become the content of a vocational curriculum;
2. lecturers use pedagogic strategies to support learners to engage with the meaning of a concept for vocational studies in classrooms and workshops;
3. workplace supervisors explain the way in which concepts learnt in college are an embedded part of the design of workplace artefacts and/or work practices.

Moreover, Guile (2011: 455) emphasised the challenges that learners might face with knowledge transfer when encountering the same concept in different contexts.

Biemans et al (2009) concluded that the implementation of competence-based education required a totally different attitude in regard to the roles of teachers, workplace supervisors and students. They suggested that the emphasis on student-centred learning in competence-based systems was different from previous teacher-centred instructional systems and that this change could be easily overlooked. They argued that teachers in both college and work contexts should balance their roles as teachers and experts in order to stimulate students' self-responsibility and self-reflection to establish a sound basis for lifelong learning. Furthermore, Biemans et al (2009) suggested that students needed a high degree of coaching by way of external support and guidance, especially in the early stages of their educational programmes. Thus, teachers, workplace supervisors and students needed to develop their teaching competencies to fit with competence-based curricula (Biemans et al, 2009).

Guile and Okumoto (2007) also viewed types of vocational practice as learned in situation, which may be supplemented by students' grasping the diverse disciplinary knowledge that is an integral part of that practice. Where integrated vocational teaching and learning is difficult, Brockmann, Clarke and Winch (2010: 124) suggested that 'FE colleges can be better equipped with sophisticated workshops to provide simulated work experience; special training projects might also be set up to provide the necessary work experience'. This

approach was supported by Rush et al (2010: 468), who found simulations could provide a safe, realistic environment to learn 'where mistakes can be made without loss of life or expensive equipment'. However, most importantly in relation to college-based vocational teaching and learning, Rush et al (2010) promoted simulations as a means of allowing theoretical knowledge to be used in college practice. This supported Guile's (2011) notion of recontextualisation and the teaching opportunities for integration, mediation and embodiment of theory in practice described earlier.

Simulations are already in use in FE colleges for plumbing and particularly for gas training and assessment, and they do provide the opportunity for some trainees to learn the skills that carry health and safety risks in a safe environment. Unite (2012: 10), however, argued that college-based courses can create 'under-qualified individuals, who have the misconception that they are then able to undertake safety critical work'. A study undertaken by Gulikers et al (2008: 410) of simulated training and assessment environments found that when students entered the field of work, they often experienced a 'reality shock' because the real world of work was completely different from what they had expected while studying in college.

It was important, therefore, in my own study, to explore the ways in which simulations were used in college and the extent to which they could be considered to provide effective preparation for the workplace. I wanted to explore where aspects of the application of theory in practice existed in plumbing teaching and learning and where they were unacknowledged, ignored, resisted or difficult to implement. Therefore, one aspect of my study involved identifying the links that teachers made between classroom and workshop learning for full-time students and apprentices in college-based training and how this learning related to apprentices' work activities. In addition, I wanted to investigate the way in which both full-time students and apprentices were assisted and the way in which they embodied the theory and practical elements of their college learning within their college practical sessions and in their work practices.

## 2.4.2 Teaching and learning in apprenticeship environments

Fuller and Unwin (1998: 162) considered it important to 'recognise the particular needs and aspirations of the young people who make up the apprentice client group' for vocational education and apprenticeships. They (Fuller and Unwin, 1998: 162) cautioned that 'the learner-led movement's ideal of people taking responsibility for their own learning, is dependent on the degree of autonomy individuals can exhibit'. In other words, not all apprentices exhibit the same degree of autonomy in taking responsibility for their own learning. Brockmann's (2010: 69) English study of car mechanic apprentices found that some rejected a particular style of academic learning in the form of academic study, but highlighted that they learned through practical activities performed through social interactions, where they developed their own worker identities (Brockmann, 2010: 69). In a similar way, Tanggaard's (2007: 462) Danish empirical study of craft apprentices reported that they perceived subjects at trade schools as too abstract and were able to learn more effectively in the workplace.

For transmission-type pedagogies, which include lecturing and didactic types of instruction, Dewey (1916: 110) suggested that 'words and symbols may be easily taken for ideas' because some meaning is recognised. In so doing, the very perceptions of the relations that confer significance are restricted. According to Dewey (1910: 176), words could abstract and preserve a meaning only when the meaning had first been involved with our own direct experience with things. To attempt to give a meaning through a word alone without any dealings with the referent is to deprive the word of intelligible signification. Thus, without relevant and meaningful experience, students may think they have understood, but they are in fact missing the process of developing relationships for the apprehension of knowledge and understanding in the first instance:

*Knowing consists of operations that give experienced objects a form in which the relations, upon which the onward course of events depends, are securely experienced (Dewey in Biesta and Burbules, 2003: 46-47).*

It is important to note Dewey's (1938: 77) assertion that, in solving novel problems, one's thought 'can expand into the future only as it is also enlarged to take in the past'. This concept has currency in more recent studies of apprenticeship, for example, where Lave and Wenger (1991: 34) argued that the generality of knowledge required the students' power to 'renegotiate the meaning of the past and future in constructing the meaning of present circumstances'. Therefore, preparatory teaching and training of knowledge presents challenges in helping students: first, to be engaged with some attention; second, to apprehend and understand the knowledge without some practical experience or activity; and third, to remember and apply that knowledge to some relevant activity in the future.

Fuller and Unwin (1998: 160), drawing on Engeström, suggested that instruction or self-instruction was necessary to 'investigative deep level learning', which could be enhanced by the following pedagogical ingredients:

- Ensuring that individuals have access to theoretical and experiential knowledge;
- The opportunity to engage in authentic tasks and interactions with others;
- The chance to develop their critical and intellectual capacities through the application of concepts and theories in practice;
- The opportunity to have their thinking and understanding enhanced through the guidance and teaching of others.

Some of these pedagogical ingredients were apparent in the discussion in section 2.4.1. These included opportunities for on-the-job and off-the-job learning in apprenticeships, high-fidelity simulations with tutor-mediated learning interactions in college, integrated and meaningful curricula and the requirement for teaching in both college and work contexts. Such approaches underpinned Fuller and Unwin's (2003) expansive model, which sought to encourage higher learning in apprenticeships. Fuller and Unwin (2012: 28) valued the processes of work as a platform for higher learning through the support and teaching of others:

*As a universally understood model of learning, apprenticeship involves the development of expertise. It is often conceived as a supported journey during which an individual matures and becomes a recognised member of an occupational community. It takes time to enable the individual to refine their vocational practice in the workplace and to acquire wider knowledge about the concepts and theories underpinning that practice. In this model, skilled vocational teachers and trainers play a key role.*

In relation to my own study of plumbing training, it was important to understand the ways in which vocational teachers and trainers fulfil such a key role in order to help apprentices and students respond and learn in an expansive way, especially since most students are unapprenticed or have no access to work experience.

Wolf (2011: 33) emphasised the importance of apprenticeship learning over college-based, full-time courses in that 'a genuine workplace teaches both general and specific work-skills more effectively than any education-based simulation can, however hard it tries'. Apprenticeship and vocational learning is context specific and in this sense 'there is no Holy Grail of skills or competences which can substitute for broad knowledge, understanding and experience' (Jonathan in Keep and Payne, 2004: 58). In his 2009 inquiry into the value of work, Crawford (2009: 100) explained the notion of Aristotelian stochastic arts that give rise to the fixing of things, such as plumbing, car mechanics and doctoring. He suggested fixing cars and tending human bodies was very different from making things from the beginning or a new starting point:

*The mechanic and the doctor deal with failure every day, even if they are expert, whereas the builder does not. This is because the things they fix are not of their own making, and are therefore never known in a comprehensive or absolute way (Crawford, 2009: 81-82).*

Crawford's (2009) assertion is relevant to the occupation of plumbing and of interest in this study. He (Crawford, 2009: 27) described the kind of judgement used in solving problems, which arises through hunches from the experience of

doing the job rather than through rules. In addition, diagnostic processes often involve social interactions. As Crawford (2009: 26) asserted, 'it is invaluable to have other mechanics around to test your reasoning against'. According to Billet (in Rush et al, 2010: 471), work-based learning promotes the construction of knowledge through contextual experiences 'including authentic (realistic), goal-directed activities, access to guidance, both close assistance from experts and "distant" observing and listening to other workers, and everyday engagement in problem-solving'. Fuller et al (2005: 65) also pointed out the reciprocal role of teaching in the work learning process in that 'apprentices as well as more experienced employees may have areas of "knowledgeable skill" which they are capable of sharing with others'. This type of socially constituted knowledge was referred to by Oakshott (in Winch, 2006: 408) as descendent from Aristotle's practical wisdom (*phronesis*). Winch (2006: 408) distinguished this practical social knowledge from technical knowledge (*techne*), which was associated with the following of rules or work recipes. He (Winch, 2006: 408) suggested that *phronesis* was concerned with social interaction, which subsumed technical knowledge interactions between man and nature.

In regard to apprenticeship, Lave and Wenger (1991: 35) described learning as an integral part of generative social practice in the lived world and not merely situated in practice, like some abstract, reifiable process. Lave and Wenger (1991) developed the concept of legitimate peripheral participation (LPP) to describe apprenticeship learning. This concept is helpful to this study in terms of understanding the process of apprenticeship learning in work. They asserted that through LPP, the apprentice gained a growing involvement with the job by watching and participating in the process of making, which involved building meaning through knowledge and understanding over time (Lave and Wenger in Unwin, 2002). There was an incremental progression in the apprentice's learning and increasing responsibilities as they moved towards the status of full participation (Lave and Wenger, 1991). The process of work presented a field for the mature practice of what the apprentice was learning to do, which gave clear purpose to the activity. Consequently, the newcomer was engaged and the meaning of learning was 'configured through the process of becoming a full participant in a sociocultural practice' (Lave and Wenger, 1991: 29). In the apprentices' sense of belonging in the community and engagement in the

process, their 'motivation to learn is stimulated by the recognition of the gap between themselves, and more knowledgeable colleagues' (Fuller and Unwin, 1998: 160).

In identifying apprenticeship learning as a process of centripetal participation from the peripheries towards the centre of practice, Lave and Wenger (1991) were critical of transmission-type instructional pedagogies, which involved acquisition-type knowledge or learning by replicating the performances of others (Fuller et al, 2005). The role of teaching in occupational learning was also underplayed by Jessup (1991: 127), who suggested that the knowledge that people actually 'draw upon, and need to draw upon, to perform competently, may not appear in what is taught'. In this sense, Jessup (1991) asserted that competent professionals acquired a set of rules or guiding principles through experience, which tended to be embedded in practice and not explicit. He reasoned that the 'more relevant knowledge and theory which actually underpins professional performance is often acquired in a somewhat ad hoc manner, largely through experience, when the individuals encounter real problems in practising the profession or doing a job' (Jessup, 1991: 126). Eraut (1994: 111) referred to these guiding principles as associated with skilled behaviour, which he defined as 'a complex sequence of actions which has become so routinized through practice and experience that it is performed almost automatically'. Therefore, the integrated curriculum, the mediation of learning and the embodiment of knowledge and skill in apprenticeship, as discussed by Guile (2011) above, is tacitly constructed in the workplace through apprentices' ongoing productive activities with others. This, along with the way in which apprentices deal with making mistakes, is a key focus of the observations of apprentices in the workplace in my own study.

Cohen (1999: 143) articulated one of the characteristics of technical learning: 'elementary structures and underlying rules that constitute a discipline' emerge most clearly when they are broken. The mistakes made by novices and deliberate deviations from customary practice made by old hands were both integral to the learning process (Cohen, 1999). In making mistakes through taking risks in the process of work, apprentices demonstrate their willingness to participate and take on increased responsibilities:

*Moving toward full participation in practice involves not just greater commitment of time, intensified effort, more and broader responsibilities within the community, and more difficult and risky tasks, but, more significantly, an increasing sense of identity as a master practitioner (Lave and Wenger, 1991: 111).*

Lave and Wenger (1991: 20) contended that, 'Mastery involves timing of actions relative to the changing circumstances: the ability to improvise'. This type of temporal knowledge and skill inherent in work learning was captured by the ancient Greek philosopher Heraclitus (in Eriksen, 1995: 86), who said that 'man cannot enter the same river twice, because both man and river would have changed in the meanwhile'. In relating this philosophy to the act of knowing, Biesta and Burbules (2003: 12) stated that, 'both the knower and what is to be known are changed by the transaction between them'. When this temporal concept of knowledge is applied to standards-based learning, a difference is revealed. In standardised learning for NVQs, the knower may have changed in the process, but the standards remain the same, with their inherent knowledge at risk of losing relevance and currency over time. As a consequence, college-based training is likely to fall short of what plumbers experience in the changing nature of their day-to-day experiences. Preparatory types of training in college are therefore compromised because they lag behind the real world, meaning that full-time students may not always be learning the right skills for the job and may experience a reality shock when they enter the workplace. This adds to the above-cited problems relating to the authenticity of simulations (Gulikers et al, 2008).

Lave and Wenger's (1991) point of departure from the standard paradigm of education — which usually associates learning with the epistemological through cognitive, transmission-type approaches to knowledge acquisition — was a shift towards the value of learning through socially constructed meanings. These were perceived as ontological in terms of an actor's developing an identity, or 'being', as a participant in some community (Fuller et al, 2005: 50). Apprentices at work benefit in terms of the development of adult identities, which are associated with occupational status (Fuller and Unwin, 1998: 160). Rikowski



(1999: 62) pointed out a temporal break in the apprentice-master relationship where apprentices 'come out of their time'. This occasions an ontological break where apprentices become different persons and learning involves the construction of identities, historically recognised as journeymen and master (Rikowski, 1999; Lave and Wenger, 1991). Lave and Wenger (1991) suggested ways of thinking about learning as the historical production, transformation and change of persons. This is important to consider within my own study of apprentices in terms of their behaviour in college as compared with that in the work context. Tanggaard (2007: 462) described apprentices' ambivalence to trade school in her study as a dimension of how apprentices identify with becoming journeymen. She asserted that it might be constructive for apprentices to disengage discursively with college learning if the apprentices are staking their identity on trying to connect to the values of work. Lave and Wenger (1991: 115) argued that such development of a sense of identity was inseparable from learning and central to the careers of newcomers or apprentices in communities of practice.

In summary, apprentices are located in communities of practice with others who support their learning journey, often through informal types of teaching interactions. Such technical exchanges are particularly important for technical occupations, such as plumbing, which involve safe working processes and procedures that can be explained in language. However, plumbing apprentices also problem-solve and deal with unexpected events, which are part of their day-to-day work. In these circumstances, vocational teachers play a key role in supporting the apprentices' learning and supported risk-taking. It is also important, however, to explore the experiences and perceptions of those students who rely on full-time college courses for their sole means of occupational training. Apprentices located in restrictive types of apprenticeship as well as unapprenticed plumbing students may not have access to the varied challenges and aspects of support through social learning discussed in this section (Fuller and Unwin, 2003). Therefore, there are implications for the way in which students in college identify with their learning and how teachers help them to become part of learning communities away from the work arena. These are key areas of focus for my own study.

## 2.5 Assessment

Jessup (1991) suggested that a distinction was normally made between the knowledge and skills that underpinned competent performance. He stated that skills could only be demonstrated through their application in performance (doing something) while knowledge could be elicited through the more abstract means of conversation, questioning and writing (Jessup, 1991). In keeping with the separation of theory and practice described earlier for the teaching and learning section, this part of the chapter dealing with assessment is also presented in two parts. The first section focuses on subject knowledge assessments in the college context and the second, on practical assessments in college and the workplace.

It is important to note that, unlike in Germany where a licence to practice 'can be gained only by successfully completing an apprenticeship' (Bynner, 2011: 21), in the UK, 'there are additional routes into occupations which do not require completion of Apprenticeship for most sectors in the economy' (Keep and James in NAS and BIS, 2012: 27). For apprentices therefore, vocational qualifications provide off-the-job training while for the unapprenticed (full-time students, the unemployed, self-employed and volunteers), they provide college-based routes into occupations and licence to practice. Therefore, as an alternative to apprenticeships, unapprenticed plumbing students in England can undertake occupational training and assessment in college and then register with licence to practice schemes without undertaking on-the-job training in the same way as apprentices. This means that some of the qualifications meeting the requirements for licence to practice type schemes for the BSE sector provide a degree of equivalence to the recognised outcomes of apprenticeships. As a result, alternative routes into occupations challenge the purpose of apprenticeships, widely respected in other European countries, as the recognised means of occupational training. Hence, it is important to my own study to review some of the literature associated with occupational training in terms of knowledge and practical assessments in college and work contexts in relation to both full-time plumbing courses and apprenticeships.

## 2.5.1 Subject knowledge assessments

Chapter one reported the growth in the skills sector and self-employment where FE institutions and training providers rather than employers were positioned to accommodate large numbers of full-time students on preparatory courses. The supply-side flexibilities of vocational training accommodated government-funded initiatives for the unemployed (e.g. 'Train to Gain') and for career switchers, such as those undergoing military resettlement. Such flexibilities in training include opportunities for students to learn and be assessed on knowledge, through online learning in some instances, separately from the practical skills activities.

For the City & Guilds technical certificate qualification in plumbing, subject knowledge is inherent. The modules of delivery relate to the assessment material, which forms the basis of the subject knowledge teaching and learning (Stanton in Ertl, 2006: 111). Each module has an individual summative knowledge assessment using the Gola online system. This system claimed to enable candidates to be tested anytime and anywhere using a networked computer. City & Guilds (2008b) described Gola testing as 'easy to implement and administer, cost effective, secure, and free to set up'.

In terms of the plumbing qualification, the National Association of Plumbing Teachers (NAPT) (2009: 2) stated that following the removal of the paper-based testing system and the introduction of Gola, some colleges 'are reporting that their pass rate has dropped from 90% to just 20%'. Although it was stated by the NAPT (2009: 2) that 'questions are being asked about the validity of the questions and whether online testing is suitable', the drop in scores may be attributed to tutors not knowing the test content and students not being prepared in the same way that they had been previously. Linn (in Black, 2001: 72) provided an example to show how multiple-choice questions could impact on teaching and learning by presenting evidence of fluctuating test scores when the format of assessment was changed. Linn's example related to a North American state, which used a particular standardised test A and, in common with almost all other regions, its scores were above the average. Test A was then changed for another version from another supplier to test B. The 'scores

immediately fell below average, but then rose to above average again over the next few years' (Linn in Black, 2001: 72). The researchers then reintroduced test A with a sample of pupils from the same state. They found that the test scores declined from their original test A level to the equivalent level as the scores for test B when it had first been used. Linn's example reflected how teaching to test and/or students' familiarisation with the test items is almost inevitable when multiple-choice questions are used as assessment instruments (Linn in Black, 2001). It may explain why the pass rate dropped significantly for the plumbing technical certificate tests scores with the introduction of Gola system.

However, the problems associated with using multiple-choice questions for assessing occupational knowledge are widely documented. Black (2001: 72) asserted that, while the use of multiple-choice tests could lead to short-term illusory gains in learners' test performance, 'standards imposed by the pressure of external tests can be counterproductive in that they can damage classroom teaching and learning'. Such counterproductive consequences of using multiple-choice for external tests were described by Ecclestone (2002: 20, 36) as rewarding 'short-term goals' and replication of information leading to the side effects of surface learning to get through the test.

Frederiksen (1984: 194) stated that the widespread use of 'the economical machine-scorable tests' had driven out other types of examinations, leading to a bias in the educational process. He argued that bias towards testing for specific criteria such as factual knowledge decreased efforts to teach other important abilities, which were difficult to measure (Frederiksen 1984: 193). Bowman and Peng (in Frederiksen, 1984) investigated what multiple-choice assessments actually measured and found that, from the review of cognitive abilities including memory, comprehension, analytic thinking and evaluation, 70% of questions tested memory. Frederiksen (1984) argued that complex items, which are constructed to measure deeper knowledge and higher order cognitive skills, tended to elicit factual knowledge rather than the more complex cognitive processes required for problem-finding and problem-solving. Frederiksen (1984) went on to suggest that ill-structured problems found in day-to-day work situations were unlikely to be found in standardised achievement tests. If they

were, it would be deemed as unfair unless the appropriate instruction to solve such problems were given. Consequently, the abilities most economically tested become the ones that are most taught, making 'teaching to test' almost inevitable (Frederiksen, 1984). It may be concluded from the literature that multiple-choice tests alone may not be a suitable means for assessing subject knowledge in relation to plumbing.

Black and Wiliam (in Ecclestone, 2002) suggested that unless formative types of assessment were incorporated within pedagogy and linked to subject content, feedback and support, then testing strategies were unlikely to engage learners on a deep level. Ecclestone (2002) described the constructivist perspective of formative assessment, which encouraged teachers and more expert peers amongst students to work more collaboratively with less expert learners. Here, the scaffolding of students' learning took place, helping them to close the gap between where they were and the standard they needed to achieve, which helped them to internalise the standard of work implied in the criteria. Ecclestone (2002) suggested a better diagnosis of learners' needs and interests. To improve student efficacy and motivation, she also advocated reviewing achievement and actively involving learners in assessing the quality of their own work, which she described as integral features of progressive assessment. However, it was suggested by Ecclestone (2002) that teachers and students did not view assessments as deepening their learning; instead they were perceived as meeting requirements such as retention and achievement targets. In relation to my own study, it was therefore important to explore the current methods of practical and knowledge assessments for plumbing, in both college and workplace contexts, and to investigate whether these were perceived as fit for purpose by tutors and students.

### **2.5.2 Practical assessments**

Practical assessments for technical certificates in plumbing are simulated and college-based. The technical certificate assessments consist of a number of small skills-based tasks, which lead up to summative assessments involving the installation of plumbing systems. Alternatively, the NVQ practical assessments take place in work contexts and are observed by a qualified assessor, employed

by the college or training provider. The NVQ candidate is also required to keep a workplace evidence record, consisting of a portfolio of plumbing tasks performed at work, which is signed-off by the students' supervisor at work.

Aspects of apprenticeships and preparatory types of full-time college training and assessment, which include realistic types of simulated work environments, signify a move away from Jessup's (1991) original intention for the NVQs to be located mainly in the workplace. Hyland (1994) reported that this was likely in the early days of NVQs because much of the emphasis on work training had to be modified and adjusted to accommodate the actual needs of colleges. Hyland (1994) stated that many NVQs were taught and assessed in simulated work environments in colleges, just like the BTEC or City & Guilds courses to which they were attached. However, the reliance on simulations for NVQs continued into the early twenty-first century with some intensification, to such an extent that the Conservative Party (2008: 5) suggested that 'much training has become virtual'. Therefore, the need for employment or work experience to satisfy the NVQ performance criteria, cited by Stanton and Bailey (2004: 22) as a barrier to progression for full-time students, was becoming less of an issue. The flexibility afforded by the technical certificate qualifications provided opportunities for unapprenticed students to learn practical skills in simulated college environments. They were then at liberty to seek employment or work experience with plumbing employers in the future as volunteers for short periods in order to gather the minimal on-site evidence for the industry-recognised NVQ. As discussed above, training for the future is a key aspect of college-based approaches, which involve students' skills and knowledge transfer from college to work contexts.

Alternatively, for technical certificate graduates progressing to NVQs, it seemed acceptable for the unapprenticed students in this study to volunteer to perform jobs in their own houses or on properties owned by friends and family to gain their NVQ workplace evidence. For the plumbing NVQ observed in this study, the assessor established who the workplace recorder should be for the candidate workplace evidence record. The workplace recorder had to be a qualified plumber and employed by the same firm as the candidate. However, it was reported in the introductory chapter that a college assessor could fulfil this

role for the minimum of two on-site assessments. This meant that unapprenticed students were not required to be employed or supervised by a subject-specific mentor to achieve an NVQ, bringing a level of inclusion and flexibility to the attainment of industry-recognised plumbing qualifications.

Stanton and Bailey (2004) pointed out that NVQ assessments were often carried out by a person whose salary was dependent upon candidates passing the test. Moreover, as Young (2011: 265) suggested, 'Instead of confidence being placed in the judgements of specialists – for example, master craftsmen or professionals – it is placed in those who are experts in procedures for interpreting outcomes that apply to all occupations and sectors'. The move towards simulated training and assessments in college, which claimed to resemble real-world plumbing situations, reduced the amount of work-based training assessment required for plumbing occupational qualifications. However, to satisfy the requirements of validity in line with work-orientated schemes, assessments for NVQs and technical certificates were still intended to be assessed under conditions as close as possible to those under which they would normally be practised (Jessup, 1991: 49). This meant that colleges needed to replicate those activities and scenarios in the training centre that plumbers would be likely to encounter at work.

Rush et al's (2010) evaluation of nurse training in England, reviewed earlier, described the limitations and benefits of simulations for training and assessment. The benefits of simulations for plumbing and gas training now extend to competence assessments in safe college environments rather than in peoples' houses. Rush et al (2010) asserted that while the aim of high-fidelity simulations was to allow theoretical knowledge to be related to work practice, mimicking reality as accurately as possible, they were also central to facilitating the assessment of occupational competence in college contexts. In relation to my own study, I wanted to explore whether simulations were perceived by tutors and students as being authentic and/or having high or low levels of fidelity.

In regard to simulated training and assessment environments, a study in the Netherlands by Gulikers et al (2008: 401) 'examines whether students and teachers differ in their perceptions of the authenticity of various assessment

characteristics'. They reported that teachers often thought that their assessment practices were more authentic than they actually were. From the learner's point of view, assessment practices might not be authentic at all since their perception of real-world practices may be different. Therefore, the discrepancy between tutor and student perceptions of authenticity may signal that students do not have an accurate or complete picture of what professional practice entails. Gulikers et al (2008) suggested in their findings that there was still a big gap between learning and assessment, on the one hand, and working, on the other. In addition, the relevance of authentic assessment practices was emphasised since students' interest and motivation in developing skills was largely dependent on the perceived relevance of the skill to the students' future work (Lizzio and Wilson in Gulikers et al, 2008). Nevertheless, Gulikers et al (2008) acknowledged the challenges associated with competence-based assessment, which they suggested required the professionalisation of teachers and support for students to understand the ideas of competence-based education with authentic assessments. They suggested explicating how teachers and various student groups perceived authentic assessment as a crucial step in developing authentic assessments, which appropriately resemble professional practice in the eyes of both students and teachers. Gulikers et al (2008) advocated a collaborative approach to the development of authentic assessments in order to decrease the gap between college learning and working (Gulikers et al, 2008).

In summary, multiple-choice knowledge assessments using Gola online testing via a networked computer has advantages over paper-based tests. However, the literature suggests that multiple-choice tests may lead to surface learning and impact on classroom teaching. Therefore, my study aims to investigate tutors' and students' perceptions of subject knowledge assessments in plumbing training. For practical assessments in college, simulations were described by Rush et al (2010) as providing safe approaches to vocational assessments. Both Rush et al (2010) and Gulikers et al (2009) suggested that in order to be successful, assessments were required to have a high degree of relevance and fidelity to real work practices. However, it was reported in chapter one that the majority of plumbing students do not have work placements, so there is greater reliance on the utilisation of simulations for students' learning.



Therefore, my study investigates the use of simulations and teachers' and students' perceptions of their advantages and disadvantages.

## **2.6 Conclusion**

From the late twentieth century to the present day, the NVQ has served a dual purpose as the outcome of apprenticeship and as an inclusive occupational qualification for unapprenticed students pursuing alternative routes into occupations. The introduction of technical certificates as part of the MA arguably increased the emphasis on college-based training, which supported the NVQ. At this juncture, there was a shift away from the need for sustained types of employment for NVQs and a leaning towards college-based technical training as preparation for work. The technical certificate provided a modular curriculum for knowledge as well as practical training for unapprenticed students to enter the occupation of plumbing, which had not necessarily existed previously for the NVQ. In this sense, industry-recognised, competence-based qualifications were available from college-based training, which made up the larger part of the NVQ. Therefore, the NVQ was a standard award for apprentices, who did most of their training at work, and for the unapprenticed students, who did most of their training in college. Thus, it is assumed that the quality and content of different occupational routes leading up to the NVQ in plumbing do not influence the perceived quality or social standing of the product.

A search for empirical literature was conducted in relation to the area of focus of my study, namely tutors' and students' perceptions and experiences of full-time college courses and apprenticeships in plumbing. This revealed that there were few empirical English studies of apprenticeships and full-time courses in college and work contexts. In addition, there were very few practitioner studies that used ethnographic approaches and semi-structured interviews to seek tutors' and students' perceptions of vocational education and training. Most importantly for my contribution to the field, none was found that specifically related to plumbing in the early twenty-first century. In order to help to fill the gap that existed in the literature, I identified my overarching research questions as:

What are tutors' and students' perceptions and experiences of full-time college courses and apprenticeships in plumbing? What changes, if any, need to be made in order to improve the quality of training for the plumbing profession?

In order to answer these questions, I formulated a number of research sub-questions, beginning with teaching and learning:

1. How is plumbing taught and learned in the college context and in the workplace context?

My second sub-question focused on the issue of assessment:

2. What are the current methods of assessment in college and workplace contexts and are these perceived as fit for purpose by tutors and students?

In addressing the issues concerned with teaching, learning and assessment in college and work contexts, there was also the need to understand more about the way knowledge and skills were transferred by apprentices and students between the classroom and workshops in college and between the college and work contexts. This notion of knowledge and skills transfer was reflected in the empirical and theoretical literature, where the integration and relevance of knowledge training in relation to students' practical activities was emphasised. In relation to helping students to link subject knowledge to practical activities, it was argued by Fuller and Unwin (2012: 8) that in the apprenticeship model, 'skilled vocational teachers and trainers play a key role'. For the purposes of this study, a skilled vocational teacher could be a plumbing tutor in the college context or a plumber who was supervising an apprentice in the work context. Therefore, my third research sub-question explored the relevance of curriculum and pedagogical issues concerned with the linking of theory and practice between different classroom and workshop contexts in college as well as between college and work contexts:

3. To what extent are links made between theory and practice in college and workplace contexts and how are such links perceived by tutors and students?

My review of the literature provided strong evidence that linking theoretical learning with authentic simulations and work experience was important. Recent empirical studies by Guile (2011), Rush et al (2010) and Monks (2010) all emphasised the importance of opportunities for students to embody their theoretical learning in work-related practice, which leads to deeper understanding and higher levels of student motivation. Therefore, my fourth sub-question was:

4. What is the importance of work experience in the teaching and learning of plumbing?

In the next chapter, I explain how I designed my study to answer these research questions. I discuss my methodological approach, my sampling strategy, the construction of my research tools, how I carried out the data gathering and the data analysis processes I adopted. I also consider the ethical issues relating to my study.

## **3 Methodology**

### **3.1 Research aims**

This research aimed to investigate full-time college courses and apprenticeships in plumbing from the perspective of tutors and students. The English FE sector has been identified as extremely under-researched in comparison to other phases of education and, as discussed in chapter two, there have been no studies specifically focusing on the experience of plumbing training and education in England in recent years. The aim of this study was to contribute to understandings of how plumbing is taught and learned and, subsequently, to consider whether full-time college courses and apprenticeships equip learners with the knowledge and skills required to operate effectively in the sector.

### **3.2 Research questions**

As set out in chapter two, the overarching research questions for this study were:

- How is plumbing taught and learned in the college context and in the workplace?
- What changes, if any, need to be made in order to improve the quality of training for the plumbing profession?

In order to answer these questions, I undertook an interpretive study, employing qualitative data collection instruments. These comprised participant observations and informal research conversations with tutors and students in the college setting and workplace and formal 1:1 semi-structured interviews with tutors and students. The tutors and students were sampled from three FE colleges in the southwest of England. The research design, sample sizes and characteristics, research instruments, data analysis methods and ethical issues are discussed later in this chapter. First, I present the philosophical position underpinning the research questions I posed and the design of this study.

### 3.3 Philosophical influences

This was a qualitative study positioned within the interpretive paradigm. Interpretivists believe that knowledge is socially constructed and seek to explore and understand how the meanings that people bring to situations or issues are formed through and in culture (Wolcott, 1995). Rather than starting with a hypothesis, as a positivist researcher often does, the focus of the interpretivist research is on gaining a deep understanding of the phenomenon being studied. Such an approach is sometimes referred to as 'hermeneutic', meaning 'to interpret' or 'to understand' (Crotty, 1998: 88). While positivists mainly adopt quantitative research methods, which allow them to test hypotheses and to generalise from large sample sizes to the wider population, the interpretive researcher utilises data collection methods that facilitate the gathering of qualitative data, providing 'thick descriptions' of what is being studied (Geertz, 2000). I have already indicated in chapter one that I held strong personal views of the challenges facing plumbing education and training today, but I had to acknowledge that these were my own opinions and might not be held by others. In order to explore tutors' and students' perceptions in a systematic way, which would allow the meanings that *they* attached to plumbing education and training to emerge, I adopted some aspects of ethnographic research methods. The term 'ethnography' is derived from a combination of two different words: 'ethno' from the Greek noun *ethanos*, which means 'people', and *graphy* from the Greek verb 'to write', so ethnography means writing about people (Erickson, 1973: 10; Silverman in Pole and Morrison, 2003: 18).

However, this study was not a traditional type of narrative ethnography. In contrast to long stays at one particular research site (an approach often associated with ethnography), I undertook 'a descriptive and explanatory snapshot of reality' (Crabtree and Miller, 1992: 3) at each of the three College sites involved in this study. Therefore, my own approach was more akin to 'ethnographic snapshots'.

In taking an ethnographic style of approach, my own plumber and teacher biographies enabled me, in the role of 'self as researcher', to interpret and understand aspects of culture and language used by the groups I was

observing. Hammersley (1992: 44) argued that the superiority of ethnography is based precisely on these grounds, namely that 'it is able to get closer to social reality than other methods'. In addition, an important feature of the ethnographic snapshots was to 'document the multiple perspectives' (Hammersley, 1992: 45) to be found within and between the social groups in my study. I aimed to understand the perspectives of others in the research 'rather than simply judging them as true or false' (Hammersley, 1992: 45). This approach allowed me to go beyond my own opinions in order to document the perspectives of others in relation to the aims of my research.

In relation to making meaning from events and relationships between people, the theoretical perspective of symbolic interactionism underpins the type of ethnographic approach I adopted. Symbolic interactionism places an emphasis on the empirical world in dealing with small scale, everyday life and seeks to understand situated processes, relationships, motivations, group life and so on (Woods, 1996). When this social construction is viewed through the lens of a single actor and 'meaning-making' (Crotty, 1998: 58) is that of the individual mind, the term constructivism is used. To a constructivist, reality is local and, in this sense, phenomena are perceived and interpreted in the subjective particular and conditional to the context (Glaser, 2003). Therefore, the social reality in the research settings under investigation in my study is idiosyncratic because it is not the same as other social realities, 'since each is constituted by the distinctive interactions, perceptions and interpretations of members of the social group' (Pring, 2000: 108).

When taking a constructivist position, generalisations are not feasible because what can be said of one group of plumbers cannot be necessarily applied to another occupational group owing 'to each group being defined in terms of its own negotiated meanings' (Pring, 2000: 108). On the other hand, Pring (2000: 109) suggested that 'members of the groups under examination share with other human beings certain typical emotions and feelings, aspirations and hopes, needs and wants'. Therefore, similarities may be recognised with other groups in similar situations, such as in the behaviour of plumbers in relation to other plumbers in different contexts or of plumbers in relation to electricians, or concerning occupations that share comparable trade characteristics. It was not

my aim to seek generalisations from my study. What my study aimed to do was to examine and understand tutors' and students' perceptions of plumbing education at a particular point in time and to facilitate reflection and comparison where shared characteristics exist.

Getting 'up-close' to the research participants enabled me to observe tutors and students in the college and work contexts. This facilitated dialogue about what was being observed and provided my participants with the opportunity to discuss aspects of plumbing training from their own perspectives in an environment where they could be sure they would not be identified. A finding of my exploratory pilot study was that, although they were described as stakeholders by the SSC, the teachers participating in the pilot study believed that they had not been sufficiently consulted on plumbing qualifications. Tutors in my study appeared to value the opportunity to speak candidly about their own concerns and some expressed an interest in reading the findings of my research once the study was completed.

### **3.4 My role in the study**

It is widely acknowledged in interpretive research in general and in ethnographic research in particular that the researcher is the key instrument in the collection of data. Given my biographical experiences as plumber, plumbing teacher and student of education (described in chapter one), it is important to clarify that my approach was neither auto-ethnographic, nor action orientated. This was because I was not an employed teacher or plumber researching my own particular plumbing or teaching practice, nor was I researching the views and experiences of my own apprentices. My focus was, instead, on the perceptions and experiences of members of other social groups associated with plumbing and plumbing teaching. There were three main reasons for this. Firstly, I had given up teaching to make time for my postgraduate studies, so did not have access to my own student groups. Secondly, I wanted to look at practice across a range of institutions to enable me to better understand the factors influencing tutors' and students' views and experiences and to have the opportunity to explore whether institutional characteristics and ethos might be influential. Thirdly, researching other people's teaching practices created some

degree of distance because in order to see clearly, taking a step back is sometimes required (O'Reilly, 2009). Therefore, I was not necessarily an insider in the groups I was researching, but I was furnished with some insider characteristics in terms of my acculturation, knowledge and language.

Woods (1996) advocated the 'insider' approach, arguing it enables the researcher to gain a deeper understanding of the values, beliefs, behaviours and experiences of people in their cultural milieu. This is achieved by getting up-close, adopting their roles and seeing them in various situations and moods, appreciating the ambiguities and contradictions in their behaviour, exploring the nature and the extent of their interests and understanding their relationships among themselves and with other groups (Woods, 1996). It can be argued that my position as a plumber researching plumbers chimes with aspects of the feminist perspective, which advocates a shared culture between observer and participant and between interviewer and interviewee. To this end, O'Reilly (2009: 67) argued that 'black women are needed to interview black women' and 'a study of mothers should have a mother as interviewer'. Although O'Reilly's (2009) stance can be challenged, she emphasised the depth of understanding that can be achieved through this shared culture, which may be difficult to achieve by a complete outsider conducting the same research. Hence, my social and cultural capital provided helpful intellectual tools with which to derive meaning and delve deeper into the experiences and perceptions of actors in the field (O'Reilly, 2009). For the fieldwork observations, I dressed as a 'native' in overalls and work boots in order to blend in with apprentices, teachers and employers and to share in their lived realities in college and work contexts. Lee Monaghan adopted this approach in his study of door security staff in Britain's night-time economy, using his youth and muscular physique in addition to informal local networks for 'getting in and getting on with the study' (O'Reilly, 2009: 10). Conversely, in other situations, his cultural and physical capital was sometimes deemed as a hindrance because being up-close could sometimes reduce clarity, which was important to acknowledge in regard to my own position in the research.

As an acculturated researcher, I already had knowledge of the language and behaviour of the participants, but it was important that I did not take this for



granted. Our inherited and prevailing understandings are shackled by our world views, which shape, and are subject to, the culture in which we are immersed and which mean we find ourselves exposed to the 'tyranny of the familiar' (Crotty, 1998: 59). Therefore, the ethnographic researcher must 'make the familiar strange' (Erickson, 1973: 16; Delamont and Atkinson in Delamont, 2005). They must continually ask the question in the field, asking themselves why is this act, person, status, concept the way it is and not different (Erickson, 1973: 16; Woolger in Grenfell and James, 1998: 124). Bourdieu (in Hodkinson and James, 2003: 394) suggested that we see the world and interpret it from the position that we occupy within it. Furthermore, he described the notions of habitus (a collection of durable, transposable dispositions) and field (a set of positions and relationships defined by the possession and interaction of different amounts of economic, social and cultural capital). Habitus is within and the field represents the forces that are acting upon us through our interactions with each other and our interactions with institutions in society.

Bourdieu and Wacquant (1989: 33) suggested that participants in research are always positioned, along with the researcher, within the field of acting forces and power relations. Therefore, it was important for me to acknowledge my own habitus as a master plumber, a plumbing teacher and a researcher when interacting with those who may be perceived as less powerful or vulnerable. An aspect of this reflexive approach was the need for me to share my biographical experiences in the introductory chapter, which reflect my social acculturation and professional positioning (1.3). It was important for me to recognise that I was part of the world being studied and that I occupied a position of power in terms of my knowledge and experience in comparison to some participants in my study. Bourdieu's (in Grenfell and James, 1998: 126) approach gives a distinctive meaning to reflexivity where the researcher's act of reflexion involves a positioning of oneself in relation to fields (and therefore capital of various kinds) so as to reveal as much as possible of the nature of the sources and maintenance of one's own interest. This type of reflexive approach meant that I had to acknowledge that apprentices and tutors were employed and subject to constrictions in terms of disclosing information about qualifications, teaching and the institutions they worked for. In other situations, it was apparent to me and some of the tutors that some students occasionally reacted differently in

lessons, owing to my presence as a researcher. Therefore, despite the advantages of my insider position, the reactivity as a fact of investigatory life was to be acknowledged and revealed in this study, rather than resisted (Woolger in Grenfell and James, 1998: 24).

In the next section, I set out the details of the design of my project and explain how my researcher role played out in practice.

### 3.5 Research design

Figure 3.1 below provides an overview of the research design and sample sizes in each of the three colleges.

#### **College 1 (C1):**

- Observation in college sessions over an 8-week period, 1 day per week
  - NVQ2, Year 2:
    - 2 tutors observed
    - 5 students in total observed in these groups
- Observations in the workplace:
  - 1 apprentice (4 days); 1 on-site assessor (1 day)

NB: informal interviews took place during the sessions observed in college and in the workplace

- Formal semi-structured interviews
  - 4 tutors
  - 4 apprentices
  - 1 on-site assessor

#### **College 2 (C2):**

- Observations in college sessions over a 7-week period, 1 day per week
  - NVQ3, Year 3:
    - 2 tutors observed
    - 13 students in total observed in these groups
- Observations in the workplace:
  - 2 apprentices (4 days each); 0 on-site assessor

NB: informal interviews took place during the sessions observed in college and in the workplace

- Formal semi-structured interviews
  - 4 tutors
  - 3 apprentices
  - 2 adult students
  - 1 on-site assessor

**College 3 (C3):**

- Observations in college sessions over a 7-week period, 1 day per week – NVQ2, Year 1:
  - 4 tutors observed
  - 15 students in total observed in these groups
- Observations in the workplace:
  - 2 apprentices (one for 3 days, one for 1 day) and 1 on-site assessor

NB: informal interviews took place during the sessions observed in college and in the workplace

- Formal semi-structured interviews
  - 4 tutors
  - 3 apprentices
  - 2 adult students

Figure 3.1 Overview of research design

These data collection methods are discussed in detail later in section 3.7 and the participants are listed in Tables 3.1 and 3.2 along with the dates and places where the interviews took place. I also discuss later in this chapter how I addressed the ethical issues related to this study. Firstly, though, I present the research samples and an explanation of how the colleges were recruited to my study.

### 3.5.1 The college sites

It was not my intention to be able to generalise from my small-scale study because, as Woods (1996: 53) pointed out, 'if one were studying teachers' or pupils' perspectives, or the culture of a group, one would consider them in different settings, since it is well known that behaviour can differ markedly in different situations'. Therefore, approaches were originally made to the principals of four FE colleges and the chief executive officer of one private training college. This initial contact was made on my behalf by my former PhD supervisor, who had worked with these colleges in the past. The private training college and one FE college declined to participate, but three of the college principals agreed to their institution's participation in my research. Given the time limitations of my study, I seized these opportunities because, as Woods (1996: 54) suggested, sometimes 'one has to make do with an "opportunity sample" in those areas where access is offered'. However, it was not just a case of 'making do'. The colleges agreeing to the research had plumbing departments that all ran the same City & Guilds preparatory courses and NVQ plumbing qualifications plus all the colleges and their plumbing departments were of a similar size.

Once the principals had agreed to my research, they directed me to their heads of department for construction/engineering in their colleges. The heads of department then directed me to the head of the plumbing section and email contact was established, followed by a preliminary meeting at which I explained my research aims and proposed design.

I have included below some brief, contextual information on each college in the form of short pen portraits (fig. 3.2), which draw on my observations of the setting and the accounts given by tutors. These are intended to be helpful to the reader when reading the findings presented later in this thesis.

## **C1**

C1 was located in a city setting and may be described as mainstream in terms of its wider vocational provision and plumbing courses on offer. The plumbing department at this college was going through managerial restructuring at the time of the observations and it was reported that there had been previous problems with retaining plumbing teachers. The existing manager of the plumbing department had stepped down from management duties, but remained as a teaching employee. This situation had apparently created some tension between the previous plumbing manager and his close colleagues and the new manager who had been recruited from another college. The new plumbing manager had limited responsibilities in timetabling staff duties, which were organised by a manager in a higher position who was not trade specific to plumbing. This apparently created some frustrations for the new manager and the teaching staff in the plumbing section. Plumbing teachers at this site were generally disheartened by their sense of disempowerment to organise their own affairs. However, the plumbing department was well equipped and had plentiful material resources.

## **C2**

C2 was situated in a rural location and may also be described as mainstream in terms of its wider vocational provision and plumbing courses on offer. This FE college had received the highest award from the inspection body, the Office for Standards in Education, Children's Services and Skills (Ofsted), and its plumbing department was viewed as a centre of excellence. The head of the construction department was a former plumber and plumbing teacher and he had postgraduate qualifications associated with educational management. The head of the plumbing section was also an experienced domestic plumber and the workshop had its own manager/practical teacher. The plumbing workshops had been designed by the teachers themselves and there was an interactive whiteboard installed so that theory could be taught, if wished, in the practical space. A qualified plumbing tutor with extensive experience in the field was employed to support students with learning difficulties. Unlike the other two colleges in the study, C2 had a low turnover of teaching staff.

### **C3**

C3 had a city location and, like C1 and C2, may be described as mainstream in terms of its wider vocational provision and plumbing courses on offer. Tutors reported large student groups and a high demand for the college's plumbing courses. However, it was reported that the college experienced difficulties in recruiting and retaining plumbing teaching staff, and tutors reported management pressure in this respect. As a consequence of the staff shortages, some tutors were observed to be managing several groups at the same time as conducting assessments. There was also evidence that C3 was under-resourced and practical plumbing assessments had to be cancelled on some occasions because materials were not available. However, levels of pastoral support for students in terms of their learning were good, with some tutors organising breakfast mornings and five-a-side football tournaments for students. The general ethos of the plumbing section was one of collegiality and friendship between staff and students.

Figure 3.2 Pen portraits of colleges

### **3.5.2 The research participants**

This section sets out the rationale for, and the details of, the tutor and student/apprentice samples and how they were recruited.

#### **3.5.2.1 Observation samples**

In order to address my research questions, it was important that I recruited to the study a number of apprentices in each of the three colleges whom I could also observe in their workplace setting. The rationale for observing apprentices in both college and work settings was to provide deep insights into the fidelity and relevance of the college curriculum in relation to individual students' plumbing learning, which had been shown to be problematic in the exploratory pilot (1.4). The key aim when recruiting participants to my study was, therefore, firstly to secure observations of apprentices in college and then to select some apprentices to observe at work. However, this was not a straightforward

process. The choice of student groups to observe in the college context was subject to the response of tutors agreeing to participate in the research. Firstly, I approached individual tutors and sought their agreement to be observed. Secondly, I met with their groups of students to explain who I was, why I wanted to do the research and to explain issues such as the voluntary nature of their involvement, informed consent and their right to withdraw at any time. I also explained that I would want to follow some students into the work context to observe them at work too. I distributed my research information sheet at this meeting with the groups. Thirdly, I had to elicit the employers' permission to undertake observation of the students in the workplace.

Some tutors declined to be observed and some of the tutors who had initially agreed to participate taught only full-time plumbing students with no work experience placements. Therefore, my choice of student groups in the colleges was strongly influenced by having to recruit only those tutors who agreed to participate in the teaching observations and who taught employed apprentices. This resulted in the following samples:

- Year 2 NVQ2 at C1
- Year 3 NVQ3 at C2
- Year 1 NVQ2 at C3.

I aimed to find at least two participant apprentices per group per college to observe in the work context. However, at C1, I managed to secure only one apprentice for work observations owing to a range of difficulties, which were also experienced at the other colleges. These included:

- The Year 2 NVQ2 student group observed at C1 was small owing to some students having graduated. This reduced the opportunities for securing work placements with the five remaining students in conjunction with agreement from the employer.
- Smaller plumbing firms, which made up the vast majority of plumbing employers, had erratic work patterns. I had several employers who had initially agreed to observations, but these did not come to fruition

because the plumbers were too busy or not able to predict where they would be, what they would be doing or whether they would be working.

- Although I had many personal contacts through which to secure work observations with apprentices, only one of these was linked to the colleges I had already secured for observations. Hence, the employers I knew through personal networks had apprentices attending colleges other than C1, C2 and C3, and were therefore unsuitable.

Securing work observations with the students I was observing in C1, C2 and C3 was therefore very challenging. However, eventually the organisation of the workplace observations with five students (four apprentices and one adult student) came together as a convenience or opportunist sample in what Woods (1996) referred to as a snowball sample. In order to collect data to address the research sub-questions outlined at the end of chapter two, I aimed to observe teaching, learning and assessment in both college and work contexts.

Therefore, once the work observations had been secured with the students/employers, I organised for two on-site assessments to be included in the observation process, one for apprentice Curtis (C1) and one for adult student Jason (C3). The on-site assessors, who were given the pseudonyms of Graham (C1) and Les (C3), did not undertake any formal teaching activities, but they were able to communicate their perceptions of the on-site assessment process and whether they considered it as fit for purpose.

Pen portraits of the five plumbing students who were observed in both college and work contexts are provided below. The rationale for describing these five students in detail here is that the perceptions and experiences of these students are referred to in the findings chapters with more depth and frequency than the tutors and other students who were observed and interviewed only in the college contexts. Details of those tutors and students are, however, included in Table 3.1, which sets out the sample details for all the field observations of tutors, assessors and students in college and work contexts.



## **C1**

### *Apprentice Curtis*

Curtis was an 18-year-old NVQ2 plumbing apprentice at the end of his second year at college C1. He worked for the same employer as his joiner father. This was a large multinational construction company with BSE sub-divisions. The work that Curtis did was mainly maintenance on public sector buildings located on a single, large site, which involved both domestic- and commercial-type plumbing systems for a range of large buildings. He was surrounded at work by qualified fitters (commercial or industrial plumbers), plumbers and electricians and was allocated a mentor to guide his progress. Curtis performed to his employers' expectations at work and was at the stage where he was being given responsibility to do small jobs unsupervised. Curtis had interests in computer gaming, socialising with friends and had aspirations to travel and work in Australia.

## **C2**

### *Apprentice Jake*

Jake was a 19-year-old NVQ3 plumbing apprentice at the start of his third year at C2. He had worked previously for his plumber uncle, but had secured employment in the commercial plumbing sector with a multinational BSE company. Jake was mainly referred to as a fitter at work, but he was also involved with aspects of domestic plumbing in the commercial sector in various sites such as schools, hospitals and other large-scale public sector buildings. Jake owned his own van and was capable of producing high-quality work to satisfy the expectations of his experienced supervisors. He was guided by qualified co-workers at all times and had aspirations to progress to higher qualification levels such NVQ4 in the future.

### *Apprentice Brent*

Brent was a 19-year-old NVQ3 plumbing apprentice at the start of his third year at C2. Brent was a very capable apprentice for his age because he had learned many skills from his father who was an electrician. Brent considered plumbing as an occupation that would extend the scope of his existing knowledge and skills. He worked for a small plumbing firm with six employees who undertook all types of domestic plumbing. However, Brent's work at the time of the observations was mainly associated with council contract work in general domestic plumbing maintenance. He worked confidently and was often unsupervised on council maintenance. He was assigned his own company van, but had a wide selection of plumbing tools of his own. Brent had ambitions to travel and was interested in Landover jeeps and motorcycles.

### **C3**

#### *Adult student Jason*

Adult student Jason was 25 years of age and had accumulated about five years of plumbing experience since leaving school at 16, but he had no formal qualifications. Despite this, he was a very capable and competent installer of plumbing and heating systems and components. He was in the first year of an NVQ2 at college and had worked for his property developer employer for two years. He was supervised at work by an experienced builder who had some forty years' experience in the construction industry, but he was not specifically qualified in plumbing. Jason worked with the builder as part of a small team that were employed to convert large houses into multiple flats. After periods of sporadic employment since leaving school, Jason had found a job and an employer he liked, which gave him some continuity in his life and the opportunity to progress his existing knowledge with off-the-job learning at college. He saw college qualifications, work and progression as a way of securing a better future for his partner and two children.

### *Apprentice John*

John was the son of a master baker, but rather than follow in his father's footsteps, he chose to undertake a plumbing apprenticeship at the age of 16. He was employed by a one-man-band (micro firm) plumber who had previously been a plumbing teacher in FE. John was involved with most aspects of general domestic plumbing and heating at work and he was an enthusiastic apprentice. His employer was keen to teach John aspects of plumbing at work, which supplemented his college learning. John was an active sportsman. He played golf and was involved with swimming and lifesaving activities.

Figure 3.3 Pen portraits of students observed in both college and work contexts

Table 3.1 Sample characteristics of field observations of tutors, assessors and students in college and work contexts

College sites	Duration of observations in college	Tutors observed teaching in college	Students in groups observed in college	Students' stage in plumbing qualification	On-site assessors observed in work context	Students observed at work and duration of observations
C1	8 weeks, 1 day per week, 23 Sep 2009 – 10 Nov 2009	Larry Tim	5	NVQ2 Year 2	Graham with Curtis, 1 day (16 Feb 2010)	Curtis (apprentice/large firm) 4 days (9, 10, 16 and 17 Feb 2010)
C2	7 weeks, 1 day per week, 22 Oct 2009 – 17 Dec 2009	Den Alfie	13	NVQ3 Year 3	None	Jake (apprentice/large firm) 4 days (2, 3, 9 and 10 Mar 2010) Brent (apprentice/small firm) 4 days (16, 17, 23 and 24 Mar 2010)
C3	7 weeks, 1 day per week, 26 Apr 2010 – 22 Jun 2010	Gordon Norman Darrel Bill	15	NVQ2 Year 1	Les with Jason, 1 day (9 Jul 2010)	Jason (adult student/small firm) 3 days (19, 20 May 2010 and 9 Jul 2010) John (apprentice/micro firm) 1 day (16 Jul 2010)

### 3.5.2.2 Interview samples

Across the three college sites, 29 formal semi-structured 1:1 interviews were undertaken with 13 tutors, the 2 on-site assessors, 10 apprentices and 4 adult students. The details of the interview samples and the timings of the interviews are set out, for information, in Table 3.2 below.

Table 3.2 Samples for formal semi-structured 1:1 interviews at C1, C2 and C3 (\*not sound recorded)

College sites	Tutors interviewed and dates	On-site assessors interviewed and dates	Apprentices (aged 16-19) interviewed and dates	Adult students (aged 20+) interviewed and dates	Total
C1	Larry Tim Ron Mike  11 Nov 2009	Graham*    28 Oct 2009	Chez Curtis Steve* Ricky*  11 Nov 2009	None	9
C2	Den Matt Terry Alfie  17 Dec 2009  Kim  19 Nov 2009	Luke    17 Dec 2009	Jake Oz Connor  19 Nov 2009	Jess Cathy  19 Nov 2009	11
C3	Gordon Norman	0	Sammy Charlie	Jason Gary	9

	Darrel Bill		John		
	22 Jun 2010		22 Jun 2010	22 Jun 2010	
Total	13	2	10	4	29

### 3.5.3 Research methods

The multiple research methods employed in this study were compatible with an ethnographic style of approach. The methods employed, as already signalled above, were participant observation supplemented with informal research conversations and formalised 1:1 semi-structured interviews. Charmaz (2006) advocated the use of multiple methods, stating that engagement in detailed observation and interviewing of key informants gives far more to draw on than someone who has simply conducted interviews. Silverman (in Pole and Morrison, 2003: 32-33) concurred, suggesting that interviews alone would fail to constitute the entire ‘reality’ of the educational setting and that the use of multiple methods were essential in arguing for the plausibility and credibility of research.

#### 3.5.3.1 Participant observation

Participant observation, according to Layder (1993: 40), ‘allows the closest approximation to a state of affairs’ and occurs when ‘the researcher enters the everyday world of those being studied’. This method is often used by interpretive researchers, who believe that the ‘social world must be *discovered*’ and ‘that this can only be achieved by first-hand observations and participation in “natural” settings, guided by exploratory orientation’ (Hammersley in Layder, 1993: 39). Through the use of participant observation, I was able to witness first-hand the typical experiences and attitudes of apprentices and adult plumbing students to broaden and deepen my understanding.

Teddlie and Tashakkori (2009), however, pointed out that the level of participation can vary depending on how much the observer is him/herself a part of the social situation being studied. This is important to consider given my own acculturation as a plumber and FE teacher because I was already furnished with some of the characteristics of the cohorts I was observing. Authors such as Denzin et al (in Teddlie and Tashakkori 2009: 222) differentiated four researcher roles associated with a participant observation continuum, which are helpful in locating and communicating my own approach and position within the field:

1. Complete participant — observers become full-fledged members of the group they are studying
2. Participant as observer
3. Observer as participant
4. Complete observer — the researcher is removed entirely from the interaction with the participants.

The role I adopted in my study shifted between that of participant observer and observer as participant (Denzin et al in Teddlie and Tashakkori, 2009). Early in the study, my commitment to blend in and become a 'native' in the college contexts was slightly overzealous to the extent that one of the teachers I observed was inclined to leave me to undertake the teaching and used the opportunity of my presence with the students to catch up on some of his paperwork. Woods (1996: 61-62) warned about 'the dangers of going native, one is advised to cultivate some social distance'. However, although I had to avoid getting too involved in order to reduce the impact of my presence on the tutors' and students' activities, it was also important to my methodological approach to interact closely with teachers and students. Therefore, I gradually participated in minor peripheral activities, such as passing tools.

Hammersley and Atkinson (in Pole and Morrison, 2003: 26) set out some useful pointers for the researcher regarding their role. They should consider:

1. whether the researcher is known to be a researcher by all of those being studied, or only by some, or by none;

2. how much and what is known about the research, by whom;
3. what sorts of activities are and are not engaged in by the researcher in the field, and how this locates her or him in relation to the various conceptions of category and group membership used by participants;
4. what the orientation of the researcher is, and how completely he or she consciously adopts the orientation of insider or outsider.

It was my initial intention to adopt an insider role, so I chose to wear overalls to look more like a worker 'native'. I did not want to project the image of an outsider to this group, for example by wearing a suit with a shirt and tie (Teddlie and Tashakkori, 2009: 223). However, for the ethical reasons of avoiding a covert role in the research, it was important to make my researcher identity overt and as explicit as possible. Therefore, I carried an information sheet for the participants about the project. In the colleges and workplaces, I made sure the key gate keeper (usually a manager, foreman or boss) had a copy of the information sheet and I pinned additional copies to the staffroom boards to inform the workers of my attendance (I discuss in detail in section 3.6.2 how I addressed the ethical issues related to my research).

In making my researcher role explicit, my insider, or 'native', researcher identity diminished and I became more akin to an outsider to the groups observed. However, as the research progressed, the participants quickly got used to me being around. This reduced some of the reactivity of participants to the research, allowing the setting and interaction to become reasonably natural. As a researcher with some insider characteristics, I was able to witness first-hand and in intimate detail the culture and events that were unfolding in front of me. However, I had to maintain my reflexive approach in considering my own position of power and to continually reinforce my status as researcher to all I interacted with during the course of this study.

The focus of the observations was shaped by the issues that had emerged from my pilot study and my review of the literature. They were intended to help me gather data to answer my research sub-questions. Activities, conversations and occasional disgruntlements were observed and recorded as handwritten field notes. Memories can be selective and sometimes sketchy, so it was important



for me to take advantage of note-taking opportunities as they presented themselves (Denscombe in Pole and Morrison, 2003). My jottings, which included small sketches of room layouts, key words and descriptions of activities, were referred to by O'Reilly (2009: 70) as 'scratch notes'. The notepads I used were selected for their practicality and robustness given that I was sometimes observing apprentices on damp, cold and windy building sites. The first pad I used was a 'Rite in the Rain' [sic] all-weather journal no.390f, but this was found to be a little rigid and bulky to fit in my pocket. So, I subsequently purchased journals no.393n from the same manufacturer, which were smaller, more flexible and ring-bound and capable of folding back to allow me to take notes quickly.

During my observations, I learned the importance of being able to record verbatim quotes so as to be able to represent accurately the participants' voices for the analysis and presentation of my findings. These verbatim quotes from participants hold more authority than renderings based on memory of what I thought they said or meant. Sometimes I read back some of these quotes to the participants, allowing me to seek clarification and probe for underlying meanings. I endeavoured to write up these scratch notes on the same day that the observations took place, which is an activity that Lareau (in O'Reilly, 2009: 70) ruled as 'one of the sacred obligations of field work'. However, in practice, this was not always possible owing to long days in the field and the distances I travelled for observations. Therefore, in some instances, the writing up of the scratch notes took place the following day.

### **3.5.3.2 Interviews**

In my study, I used two different types of interviews: informal, unstructured interviews, or 'research conversations', and formal, semi-structured interviews.

#### **3.5.3.2.1 Informal interviews**

By informal interviews, I mean those 'research conversations' that I had with tutors, assessors and students when I was in the field undertaking the observations. Some argue that there are drawbacks to this approach to

'interviewing'. Silverman (in Pole and Morrison, 2003: 32-33), for example, stated that 'ethnographic interviewing places a potentially heavy burden on interviewees "to talk" (regardless of whether, in hindsight, they might have spoken less rather than more if directed to do so)'. Shuy (2003), however, argued that interviewing participants in their natural context assured more accurate responses because it gave them the freedom to interrupt, introduce new topics and generally talk as they would in their everyday conversation. In addition, my position as an insider enabled me to make use of these informal conversations effectively because I could respond to situations I observed as they occurred with relevant and targeted questions to deepen my understanding of the participants' feelings, attitudes, and behaviour and, in some cases, the level of students' understanding of what they were being taught. Corbin and Strauss (2008) suggested that the most data-dense interviews are unstructured, that is they are not shaped by any predetermined set of questions.

#### **3.5.3.2.2 Formal, semi-structured interviews**

In addition to the informal interviewing undertaken in this study, I chose to undertake 1:1 semi-structured interviews with tutors, students and on-site assessors. There were a number of reasons for this. Firstly, I could not guarantee that I would be able to answer all my research questions through the data generated by my observations and informal interviews. I therefore constructed a series of questions related directly to my research questions, which I put to each of my groups of participants in order to explore in a systematic way their perceptions and experiences of plumbing education and training. An example of the types of questions used and how they related to my research sub-questions is set out in Table 3.3. Silverman (in Pole and Morrison, 2003: 32-33) warned that such formal approaches to in-depth interviewing may yield only 'predictable insights into individual experiences', but many others have written of the advantages of semi-structured interviews with the flexibility they offer to prompt, probe and follow up on issues raised during the informal interview (e.g. Wellington, 2000; Kvale, 2007). Secondly, the decision to include formal, semi-structured interviews was also in keeping with the reflexive type of constructivist research methodology I had adopted. According to Woods (1996: 53), 'the researcher is a finely tuned instrument with considerable skills, but is a

person no less, with values, beliefs and a self'. Hence, through my acculturation as a plumber and plumbing teacher, I was furnished with an inescapable bias. I did not, therefore, want to rely on informal interviewing and the data collected through my participant observations alone. I wished to gather data concerned with the research questions in terms of tutors' and students' perspectives and experiences of full-time college courses and apprenticeships. Using formalised semi-structured interviews seemed to be an appropriate way of addressing this aim.

### **3.5.3.2.3 Focus of the interviews**

As indicated above, the questions that provided the framework for the semi-structured interviews were devised to align closely to my research sub-questions (see Table 3.3). In order to help my interviewees feel at ease, the interview started with questions about themselves and how they came to be involved with plumbing. This also provided some contextual data concerned with their biographies and routes into the plumbing occupation along with what participants valued about their courses and jobs and an indication of how they felt they best learned. In addition, I asked about both full-time and apprenticeship plumbing courses in their respective colleges, the numbers of students and the tutors' and students' perceptions of the opportunities for employment for graduates of the courses. The key areas of focus in the interviews were: how plumbing is taught and learned; the relationship between theory and practice; and the nature and appropriateness of assessment methods. Participants were also given the opportunity to signal if there were any changes they would like to see to plumbing education and training. The semi-structured interview schedules for both tutors and students are included in Appendix C.

Table 3.3 The mapping of the interview questions to the research sub-questions

Research sub-questions	Examples of teacher interview questions	Examples of student interview questions
1. How is plumbing taught and learned in the college context and in the workplace context?	How would you describe your teaching practice? What are the important aspects of your teaching practice?	Can you describe a typical lesson? Does what you learn at college help you at work?
2. What are the current methods of assessment in college and workplace contexts and are these perceived as fit for purpose by tutors and students?	What are your thoughts on the way plumbing is assessed? What impact does this have on teaching and learning?	Do you find the theory assessments challenging? Do they assess your job knowledge? What is the purpose of theory lessons?
3. To what extent are links made between theory and practice in college and workplace contexts and how are such links perceived by tutors and students?	Do you think the day at college should be split into 'half and half' practice and theory? Do you think that the practical activities support the theoretical learning? Do the practical lessons help them to pass the theory assessments?	Do teachers reinforce what you have learned during the theory lessons within the practical session? Does the theory lesson relate to what you do in the practical sessions?
4. What is the importance of work experience in the teaching and learning of plumbing?	Tell me what you know of those without work placements who attend courses on plumbing, do they struggle? Do you have any concerns? What are the comparative numbers?	Can you describe the type of work you do? How does this relate to what you do at college?
5. What changes, if any, need to be made	Would you choose to do it differently given the choice,	What would you change about the

in order to improve the quality of training for the plumbing profession?	how would you change it?	course?
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### 3.5.3.2.4 How the interviews were conducted

These interviews were undertaken towards the end of the observation period for each college. This timing was considered carefully. I believed that locating the semi-structured interviews at this point in the data collection phase should have ensured that I had built up a rapport with the tutors and students. They would therefore all feel more comfortable about responding to my questions in a one-to-one situation than they might have earlier on in the data collection phase when I might have seemed to be more of a stranger. This was particularly important in relation to the students.

The tutors were asked to provide a quiet space for the interviews and both this and the timing of the interviews was negotiated with the head of department. Having experienced problematic peripheral noise levels at C1, the interviews at C2 and C3 were conducted in a pre-booked, quiet room. The duration of the interviews was planned to take approximately 30 minutes, but some were 40 minutes in length and one was only 15 minutes. The shorter interviews were owing to participants sometimes being restricted by time, for example, one tutor was interviewed during his tea break because he was busy at other times. The student interviews at C2 were shorter in length than those at the other colleges. This was because I had seized the opportunity to interview five students at C2 when a member of staff was unexpectedly absent. In this instance, the students were waiting to be interviewed, so I did not let the interviews overrun. However, the tutor interviews often overran the 30 minutes because the participating teachers were very responsive to having the opportunity to express their opinions about teaching, learning, assessment and plumbing qualifications.

All except three of the semi-structured interviews were recorded on a portable digital voice recorder similar to a dictaphone. A technical problem occurred with

the recording of the three formal interviews conducted at C1. However, notes of the participants' responses had been recorded in a field book at the time. Voice-recording the interviews allowed a large amount of data to be collected in a short period of time while also allowing freedom of interaction between the interviewee and the interviewer during the interview itself. The recorded interviews were stored securely on a password-protected computer.

### **3.6 Data analysis**

The method of qualitative analysis used in this study was systematic and thematic. The analysis of the data involved a search for themes that could be considered as the dominant trait of the phenomena under study (Teddlie and Tashakkori, 2009). I adopted some of the principles of a constructivist grounded theory approach, such as the systematic coding of data, leading to categories, code families and themes (Layder, 1998; Charmaz, 2006). Here, the narrative data were broken down and rearranged to produce categories, which could be compared or contrasted in order to address the research questions (Teddlie and Tashakkori, 2009). The approach to and process of the qualitative analysis used is explained in the following sections and an example of the coding, categories, code families and emergent sub-themes in relation to key themes are included in Appendix D.

Although some of the inductive characteristics of grounded theory analysis can be identified within my thematic analysis, this study does not employ the grounded theory approach as originally conceived by Glaser and Strauss (in Strauss and Corbin, 1998), nor does it relate directly to the positivist notions of grounded theory analysis (Harris, 2003). Instead, my approach to qualitative analysis is thematic, that is it involves 'generating emergent themes that evolve from the study of specific pieces of information that the investigator has collected' (Teddlie and Tashakkori, 2009: 252). Eisner (in Teddlie and Tashakkori, 2009: 252) saw thematic analysis as follows:

*The formulation of themes 'within' an educational criticism means identifying the recurring messages that pervade the situation about which the critic writes. Themes are dominant features of the situation....*

Some of the overarching themes within my data reflected those that had emerged through my critical engagement with the literature in the field of education and training and which had influenced the areas of focus in the semi-structured interviews. Hence, this helped in the initial organisation of the data in that some prior overarching categories concerned with teaching and learning, theory and practice, assessment and work experience existed prior to the analysis, which was, however, still open to new codes, emergent themes and concepts. Layder (1998: 54-55) argued this approach was ‘both more realistic in a practical sense and more justifiable epistemologically in so far as it refuses to endorse a naive empiricism in which the data are thought to speak for themselves and “suggest” codes and categories (as they are in grounded theory)’.

Analysis began with making full, verbatim transcriptions of the 26 recorded semi-structured interviews with teachers, assessors, apprentices and students. The notes of the remaining three interviews were written up in full. While transcribing, I made research memos relating to particular critical incidents or events that connected situated meanings or contradictions to existing theories described in the literature review. I used a manual method (rather than qualitative data analysis software) for data analysis, using printouts of the interview transcriptions. I felt that this was a practical method because it allowed me to move quickly between the different paper-based transcriptions. In my analysis of the data, I adopted the two major principles in thematic analysis that were described by Spradley (in Teddlie and Tashakkori (2009: 253) as follows:

1. The ‘similarity principle’ states that the meaning of a symbol can be discovered by finding out how it is similar to other symbols;
2. The ‘contrast principle’ states that the meaning of a symbol can be discovered by finding out how it is different from other symbols.

I worked through the interview transcriptions one at a time, line by line, using a pen to underline key quotes and assigning a ‘code’ in the form of a word or phrase to represent it. This was the first analytical step and is referred to as open coding, which is basically defining what the data are about. This was done

in segments by categorising the codes with a short name, which summarised and accounted for each piece of data (Charmaz 2006: 43; Layder, 1998).

When all the transcriptions had been open coded, I opened Microsoft Word files to organise the data into broad headings in relation to the tutors' and students' response codes. An example of the way I coded and thematically analysed the data using Microsoft colour functions to distinguish the different categories listed under each broad heading is shown in Appendix D. The coloured categories were organised into code families, which underpinned and substantiated the themes emerging from the research analysis. Thus, the data were coded and categorised into code families relating to the research questions or overarching headings, which developed into themes.

At all stages of the analysis, it was important to keep an open mind in order to allow new and creative ideas to emerge. Le Compte and Preissle (1993: 267) suggested that in order to make sense of the fieldwork descriptions, 'qualitative researchers apply theory to their data, make interpretations based on metaphors and analogies, and synthesize their results with those of other researchers'.

Sections of the written-up field notes, referred to as research memos, from the observations in college and work settings have been used extensively in the findings chapters to illustrate and illuminate the data gathered through the semi-structured interviews (Layder, 1998). Layder (1998: 49) suggested that 'memo writing is about making notes, primarily for oneself, which ask questions, pose problems, suggest connections, and so on about how the properties of concepts or categories are revealed, exemplified or contradicted in some way by the incoming data and the process of coding'. Examples of memos included the differences observed in student motivation between college and work contexts. Furthermore, memos were written about the way in which work contexts presented problems as well as variations in performance requirements for plumbing students compared to their relatively straightforward activities in college. The field observation memos also helped with my interpretations of the reliability of some tutor and student responses to questions. A small minority of tutors, for example, suggested that the plumbing theory taught in college in the



classroom in the morning was put into action in the workshop in the afternoon like a 'marriage' of theory and practice. However, the field observation memos linked to the majority of tutor interview responses suggested otherwise. Therefore, seeing what was going on in the research context was one essential element in relation to the trustworthiness and credibility of the research.

### **3.6.1 Trustworthiness and credibility of the research**

The term reliability is often associated with quantitative research, meaning that if the same research were conducted elsewhere by others under similar conditions, the outcomes should be similar if not the same (Burgess, Sieminski and Arthur, 2006). However, given my interpretive approach and using myself as the key research instrument, such reliability is neither feasible nor possible. The use of the term 'validity' also presents a problem because it involves measurement or description of some generalisable and objective truth, whereas my constructivist position is largely relativist and confined to the social groups I observed.

In terms of the qualitative research conducted in this study, Bassey (1984: 104) argued that the merit of the study of single events lies not in the extent to which it can be generalized, but in the extent to which teachers reading it can relate it to their own practice. The key function of my research is located in its relevance to legitimate public concerns, such as the training of plumbers, and in its ability to provide information that may be judged to be credible (Hammersley, 1992). Research credibility indicates that findings are believable and trustworthy and reflect the participants' experiences of phenomena whilst giving one of many plausible interpretations from the data (Laverty, 2003; Corbin and Strauss, 2008). Corbin and Strauss (2008) preferred to use the term 'credibility' when talking about qualitative research as a way of eschewing the dogmatism of truth.

The credibility of the research is just one of four criteria that Charmaz (2006: 182-183) offered for evaluating constructivist grounded theory. The other criteria included originality, resonance and usefulness, which address both the scientific and creative aspects of doing qualitative research (Corbin and Strauss, 2008:

301). Charmaz (2006) also considered other criteria that speak to the aesthetics of writing. These feelings in the narrative are reflected in the work of Blumenfeld-Jones (1995: 26) and his criterion of 'fidelity', where the 'truth of the matter' is what happened in a situation and fidelity is 'what it means to the teller of the tale'. Whilst truth treats a situation as objective, fidelity is subjective but moral in perspective. When a story is told, the teller entrusts the tale to a receiver, expecting their dignity and worth to be preserved (Blumenfeld-Jones, 1995). Therefore, I have a responsibility to the teller of the tale in my own study and, in this sense, I am duty-bound to interpret the meaning of the stories told by the participants from their perspective.

The 'trustworthiness' of qualitative research may be used as a substitute for validity issues. It is concerned with 'the extent to which an inquirer can persuade audiences that the findings are "worth paying attention to"' (Lincoln and Guba in Teddlie and Tashakkori, 2009: 26). In relation to the criteria for the trustworthiness of the research, Bruyn (in Layder, 1998: 85-86) introduced the notion of the 'subjective adequacy' of the research. This refers to methodological issues, such as length of time spent studying the group, the degree of intimacy achieved and the number of different vantage points from which the group was studied (Bruyn in Layder, 1998). These all bear some relation to helping to ensure the adequacy, credibility or trustworthiness of the concepts that the researcher produces as a result. The point about behavioural concepts is that they directly describe some aspect of a participant's behaviour, predisposition or attitude and include some reference to his or her identity or to the quality and meaning of relationships in which he or she is involved (Layder, 1998). Although these concepts may in fact be either member-defined or observer-defined, in all cases they must conform in some measure to criteria of 'subjective adequacy' (Bruyn in Layder, 1998: 85-88). Other criteria of subjective adequacy concern the extent of the researcher's familiarity with the language of the group and his or her ability to communicate with the members of the group. Here, my biography and identities as teacher and plumber supported my ability to render accurately the lived experiences of apprentices in college and work situations, as reflected in the central concepts used to describe them and their behaviour (Layder, 1998).

### 3.6.2 Ethical considerations

In undertaking any research project, the researcher must be alert to the ethical issues that may need to be addressed. Simons (in Pring, 2000: 142) described the ethics of educational research as 'the rules of conduct that enable us to operate defensibly in the political contexts in which we have to conduct educational research'. The University of Exeter requires all staff and students to submit their research proposals to an Ethics Committee for approval (see Appendix A). To complete this form, I had to make sure I had addressed the areas set out in the 'Ethical Guidelines for Educational Research', which are published by the British Educational Research Association (BERA, 2011).

The BERA guidelines require that researchers ensure they secure 'voluntary informed consent' (BERA, 2011: 5). This is to ensure that 'participants understand and agree to their participation without any duress, prior to the research getting underway' (BERA, 2011: 5). In order to meet this ethical requirement, I developed an information sheet about the study (see Appendix B) and met with participants (employers, teachers, assessors and students) before starting the research process. The information sheet made clear that participants would have the right to withdraw at any time from the research and explained how participants' privacy, in terms of anonymity and confidentiality, would be ensured. In addition, participants were offered an opportunity to access copies of the finished research on request in line with BERA (2011: 9) ethical guidelines. The sheet also provided a section for participants to consent in writing if they wished to do so. However, verbal and/or written consent was an ongoing process throughout the research. I made an effort, in both college and workplace contexts, to inform as many people as possible that I was undertaking this research and what it comprised.

In order to ensure anonymity for participants at every stage of the research process, pseudonyms were adopted for participants and colleges in my field notepads. These were stored securely at all times and have been used when writing up my findings. Protecting participants' anonymity was particularly important because I was asking tutors and students to give their views on a

range of issues and implicitly asking them to comment on what they felt worked well and what they felt was working less well. Inevitably, some criticisms emerged concerning the institutions in which the participants were teaching/learning, the way teaching and learning was undertaken, the nature of assessment and the government policy on apprenticeships. In such instances, the issue of confidentiality goes beyond informed consent by verbal or signed agreement because, with published research, claims of anonymity can ring hollow (Malin, 2003). Punch (in Malin, 2003) warned that it is often easy for participants to recognise themselves and others and worse still is when the people recognised are the wrong ones. I have borne this caution in mind when presenting the information on the three colleges and my participants and I have endeavoured to omit any information that would allow either to be identified.

It is also important that I did not repeat what some participants said about other participants in the study. In the event, very few negative remarks were made by students about tutors or assessors. Any that were made were usually in regard to their dislike of certain elements of their course or how it was organised. As for the tutors, they were constructively critical of the younger students in terms of their not engaging with the same type of motivation that seemed characteristic of their adult student cohorts. However, tutors were reflexive in identifying their concerns within the system with which they were involved and expressed that they wanted to find ways to support students and improve their college experience. Nevertheless, none of the comments made by tutors or students were discussed with the other group.

It was also important for me to consider the issue of the power relationships between me, as the researcher, and my participants. This involved a reflexive understanding of the way I positioned myself as a 'knower', relative to those, such as the apprentices, who may be perceived as less powerful (Scott, 1999: 122; Alvesson and Sköldböck, 2000). As part of my field observations, I sometimes asked students technical questions. This may have put them on the spot and could indicate that I crossed the boundaries of my researcher identity to one as teacher, plumber or assessor. However, I would argue that I had been with the students in college for between seven and eight weeks and had got to know them quite well, so chatting about technical matters through informal

types of dialogue was not threatening. I felt I was also able to sense if students or tutors were uncomfortable with my questioning from their body language and general disposition towards me. In these situations, I held back and remained quiet and observed. This was particularly the case in college contexts where I was careful about how and when I questioned students so that I did not put them on the spot in front of their peers. The 1:1 observations in the work context, I found, provided a more comfortable and appropriate context for the informal conversational questioning of students in most instances.

There was a further power dimension. In undertaking this research, I was investigating an area about which I held strong personal views. Garrick (1999) argued that there is a risk within interpretive accounts of inadvertently marginalising the voices they are supposedly highlighting. In other words, the 'researcher becomes a colonizer of the subjects through re-telling *their* stories' (emphasis in original) (Garrick, 1999: 149). Therefore, the disequilibrium of power was carefully considered within my reflexive approach in order to avoid the marginalisation of those with least power, namely the apprentices and students themselves (Malone, 2003).

As discussed earlier in this chapter, as a novice researcher, I was too keen to become an insider and to blend in as an assistant teacher early on in the research in the college context. I wanted to help the students learn plumbing skills in order to encourage a positive response to my research intervention from both tutor and students. However, I soon realised that I was at risk of crossing the ethical line as a researcher by interrupting the dynamic between tutor and student, which was the focus of my study. From then on, I took up a more peripheral role. There were some instances, however, particularly in the workplace, where it was necessary for me to cross the ethical boundaries between researcher and participant. These were when I witnessed unsafe practices being performed by apprentices. In my observations, on some occasions, I was shadowing the apprentices as they worked alone in the field. I had to take the decision to intervene where a safety risk was observed rather than do nothing.

### 3.7 Conclusion

The approach adopted in this study was located within the interpretive paradigm and drew on aspects of ethnography. This approach was considered to be the most appropriate for eliciting a deep understanding of tutors' and students' perceptions and experiences of full-time plumbing college courses and plumbing apprenticeships and, indeed, they produced a wealth of rich data. A combination of qualitative methods was utilised. These were participant observations, along with informal conversational interviews, with tutors, assessors, adult students and apprentices in both college and work contexts and formal, 1:1 semi-structured interviews with the same constituencies. In taking a constructivist approach, I aimed to interpret and represent the data from the perspectives of tutors and students in the study. At all times during the research process, I was careful to acknowledge my own position in the research as a master plumber and former FE tutor of plumbing. I also tried to take a reflexive approach to recognising the way in which I positioned myself, the way I positioned others and the way others were positioned in relation to their institutions and employers.

In chapters four, five, six and seven, I set out the findings from my study. Chapter four provides contextual data and focuses particularly on the stories that the tutors and the students told about their own routes into plumbing. In chapter five, the lens shifts to the teaching and learning processes taking place in the college and workplace settings. An area that emerged as a dominant concern of both tutors and students in this study was the divide that both groups of participants felt existed between theory and practice. Chapter six explores this divide in relation to a number of issues including: practical obstacles to their integration; the apparent overemphasis on theory in the college contexts; the lack of continuity between theory and practice sessions in college; and the lack of continuity between workplace practical activity and college-based theoretical learning. This chapter also discusses the advantages of workplace experience as identified by the apprentices and tutors. The final findings chapter, chapter seven, explores the tutors' and students' views of the way in which plumbing learning is assessed. Each chapter draws on data from both the field observations and the semi-structured interviews.

## **4 The participants' stories about their routes into plumbing**

### **4.1 Introduction**

This first findings and discussion chapter draws together a number of threads of the ethnographic snapshot data in order to provide an important contextual overview, which might help us better understand the experiences of those tutors and students who participated in the study. The chapter particularly focuses on the stories that the tutors and students told about their own routes into plumbing. In doing so, it touches on some key themes that cropped up in the thematic analysis of the research data. These include the influence of personal and family background on career and training decisions and apprenticeship opportunities, the limiting nature of socio-economic status, the influence of media portrayals of the plumbing profession, and the difference that age and social circumstances make in determining which route to plumbing may be taken up. In the discussion section at the end of this chapter and at the end of each of the subsequent findings chapters (chapters 5, 6 and 7), I reflect briefly on how government policy may have shaped, informed and constrained the experiences of the tutors and students in my study.

### **4.2 Routes into plumbing: Transitions from school to work**

When asked about their routes into plumbing, some of the participants began by telling me their story of the transitions that they had made from school to work. Many of these emphasised a long-term interest in plumbing, which stemmed from their early observational experiences of plumbing work or a period of work experience with a plumbing firm. John, one of the five students I observed in both college and work contexts, told me that he was 16 years old at the time that he made this transition. He explained why he had decided on a career in plumbing and how his attention had been drawn to plumbing at an early age:

*My next-door neighbour was a plumber and I used to watch him...I used to see him making things up and I just got interested in it. (John C3)*

On leaving school, John had undertaken a two-week trial period of work experience with his neighbour, which had led directly to a plumbing apprenticeship with day-release, off-the-job attendance in college. John had a desire to do a particular job and had little difficulty in securing employment with his neighbour's one-man-band plumbing firm.

John's seemingly unproblematic transition from school to work was not, however, representative of most of the school-leavers in this study who had made the transition to plumbing work at this stage. Indeed, there were very few instances of pupils leaving school and entering an apprenticeship aged 16 without having done some form of vocational preparatory training in school or college beforehand. Jake (C2) was also one of the five students I observed in the work context but, unlike John, he told me how his journey had begun with a college course, which eventually led on to an apprenticeship:

*...started doing the course, got a job and apprenticeship with a firm, liked it and stuck with it. (Jake C2)*

Like Jake, the majority of apprentices in this study had made this 'school-to-work' transition, which included a preparatory college course of one or two years in length. Many of the apprentices and adult students reported that they had undertaken work experience in plumbing while at school and that this had led them to take up a preparatory plumbing course. Of course, not all of them were always sure that plumbing was the occupation for them. Some of them did talk about the feelings of uncertainty that they experienced at the time and the fact that they had looked at other possible options:

*I did look into other things and have been to college in sport. (Charlie C3)*

*He offered me an apprenticeship and I turned it down and ended up going into the factory which I sort of regret. (adult student Jason C3)*

Adult student Jason was also one of the five students I observed in both college and work contexts. He was in his mid-twenties and had undertaken preparatory college training and work experience in plumbing while at school. However, he



said that he had not really known what he had wanted to do when he left school and declined an apprenticeship opportunity at the firm where he had done his school work experience. He later described this as a missed opportunity.

#### **4.2.1 The importance of family and social networks in making key career decisions**

Many of the students interviewed spoke about the relative importance of family and social networks in helping them to 'get on' in this career. This was particularly the case for those who had taken an apprenticeship route because it was often their families who had helped them gain the necessary work experience. A number of the students had parents who were in craft or trade occupations themselves. Chez's (C1) father, for example, fitted ceramic tiles, Curtis's (C1) father did general maintenance, Brent's (C2) father was an electrician and adult student Gary's (C3) father was a plumber. Charlie's (C3) cultural milieu chimed with that of many of his apprentice peers in that his family too were associated with occupational crafts:

*All my family is based around skilled people. I have got five uncles that are all based around trades. I've got mechanics, plastering, I got an electrician.... (Charlie C3)*

Despite Charlie's initial uncertainty about the plumbing profession (referred to earlier in the chapter), he mentioned the fact that he enjoyed it because it was a family experience:

*I enjoy plumbing because I went on work experience with one of my uncles'. (Charlie C3)*

Charlie was not the only one to use family connections to gain work experience:

*One of my dad's mates needed someone to help out...and I really enjoyed it. (Connor C2)*

*I just went and helped my uncle out, like, after school and that, and weekends, and liked it. (Jake C2)*

*My uncle owns his own business and he offered me a job, and it seemed like a good option. (Sammy C3)*

In a similar way to the younger apprentices just mentioned, adult student Gary (C3) was employed by his father, who was an experienced, self-employed plumber. Other adult students also reported using family and social networks to secure employment in the plumbing sector.

From the tutors' perspective at college C1, they had identified a strong trend in the way apprentices were securing jobs and work experience through familial influences:

*My theory is that it is uncles, nephews, nieces, that kind of thing, that's how they are recruited. (tutor Tim C1)*

*...a lot of apprentices we get at the moment are related — relations or friends of friends. (tutor Larry C1)*

The tutors at C2 and C3 did not make the same connections when they spoke about the routes their students had taken into plumbing. However, this did seem to be the case for students in these institutions too and was something the students themselves reported on. It would seem that, at all three sites, the students were drawing on their cultural and social capital to facilitate their employment opportunities or apprenticeship inauguration.

#### **4.2.2 Other influences on career choice**

Aside from family, the tutors suggested that another major influence on the students in their choice to take up plumbing was the media. In particular, the tutors pointed to the media portrayals that presented plumbing as a successful and well-paid job. Some of these tutors described the way they felt that the

wider public may have been led to perceive this occupation and, in turn, the influence that this might have had upon the students:

*The media portrays the plumber as an easy trade and it's a very well paid trade...there are people that come to it purely for those motives. (tutor Mike C1)*

*...it's been built up by hype of media or the prospects of earning this fabulous money. (tutor Gordon C3)*

Tutors across all three college sites expressed a concern for the way in which the plumbing occupation was represented in the media as a simple and well-paid occupation. Tutor Matt (C2) added to these arguments by suggesting that this was not something that he had directly experienced. Many of the other tutors agreed with these sentiments, seemingly suggesting that this was unfounded media hype, which at best could be unhelpful but at worst, unethical in the way in which it set these young people up with unreal expectations of what they might achieve.

In addition to the portrayal of plumbing as a well-paid job in the media, there was also an implication it was a 'job for life' or at least had steady employment prospects. There seemed to be some 'historical truth' in this perception as tutor Bill (C3) recollected the advice he had been given by his family and friends before entering the occupation of plumbing in his younger years:

*Go and get a trade, you will always need a trade. (tutor Bill C3)*

Some of the tutors described their apprenticeship routes as being closely aligned with particular companies or firms, implying that these placements provided them with a safe route into the world of work. Tutor Terry (C2) did this when he described his apprenticeship route taken with British Gas. However, some of the tutors seemed to tell these tales in order to emphasise how things had changed in recent years and in order to make the point that there was not quite so much choice or availability evident now. Tutor Tim's (C1) comments

seem quite romantic, harking back to the 'good old days', where jobs were easy to come by:

*When I was fifteen years old, there were quite a few options open to me and employers were vying for apprentices. They wanted apprentices so they made their apprenticeship more attractive. (tutor Tim C1)*

From the tutors' accounts, it appeared that this freedom to choose had meant that they were far less reliant upon family connections and social networks. The accounts also seemed to emphasise the straightforward nature of the transitions that were made between school and work. Tutor Kim (C2), a female learning support assistant, described this in a surprisingly linear manner:

*I left school after my GCSEs and got a five year indentured apprenticeship with the local council. (tutor Kim C2)*

The tutors also spoke about the fact that their apprenticeships had tended to be associated with larger institutional types of employment e.g. a local council (tutor Kim C2), large commercial contracts (tutor Den C2) and British Gas (tutor Terry C2). Once again, this contrasted heavily with the students' accounts of their apprenticeships in small family firms (Chez C1, Jake C2, Charlie C3, Sammy C3, adult student Gary C3).

For many of the tutors in the study, their routes into plumbing were influenced by their enjoyment of the job and also by secure opportunities for steady employment and a reasonable wage. However, many tutors across the three sites expressed their doubts about the security and prospects for employment for plumbing students in the current milieu. The majority of tutors interviewed suggested that it was mainly parents who believed the hype surrounding pay and employment prospects in plumbing. It was suggested by these tutors that parents were influencing their children to enrol on preparatory full-time plumbing courses or to enter the occupation through apprenticeship in the hope of steady employment and good pay:

*...a lot of parents were sending them because they thought it would always be a well-paid job. (tutor Matt C2)*

*The ones that are just drifting, they are doing plumbing because their parents say there is good money in plumbing. (tutor Darrel C3)*

*With apprentices, a lot of them have fallen in with family or friends and that, and it may not be necessarily something they want to do but they have this idea that plumbers earn a lot of money. (tutor Larry C1)*

Many of the tutors who had stated that younger students were responding to their parents' advice in choosing plumbing because it was a well-paid career were often lacking their own intrinsic motivation to engage with the discipline of plumbing.

However, despite many tutors across the three college sites suggesting that parents were influencing their children to take up plumbing for pecuniary motivations, only a very small minority of students stated that they were motivated by money alone. The majority of adult students and apprentices gave reasons other than money as to why they wanted to take up plumbing:

*I used to help my Dad with work and knew there was money in the job but I didn't take it up just for this reason. (Steve C1)*

*I worked with my uncle. He was doing alright for himself out of it, good money and that. So, went into it and liked it...I ain't in it just for the money, I like doing it. (Jake C2)*

*Well, it seems like when you've qualified, there is good money behind it, sort of thing...I didn't want to be sat behind a desk. (Sammy C3)*

In the case of Curtis (C1), who was one of the five apprentices I observed in college and work, having a job and earning money was important but he also had aspirations to travel to Australia. Jake (C2) and Steve (C1) had worked with family firms and they knew a good living could be made, but they were keen to

point out that money was not the only reason for their career choice because they also liked doing the job. Sammy thought there was good money behind the plumbing occupation but he also expressed a particular desire to avoid office work. In fact, the desire to work in a practical occupation and experience a diverse and interesting job was a prominent reason for the majority of students in the study for choosing plumbing:

*I have always had an interest in working with my hands. (Ricky C1)*

*The job is about not just doing the same thing day-in day-out. (Steve C1)*

#### **4.2.3 Second chances and career development**

The preparatory plumbing courses observed in this study seemed to provide inclusive types of opportunities for a diverse range of students to learn aspects of plumbing and gain qualifications. It was observed that there were sizeable cohorts of adult students attending full-time courses and the day-release courses in the same groups as younger students. Two out of three college groups observed in this study were populated with a sizable cohort of adult students. They represented about a third or more of the students in each of the apprenticeship groups observed at (C2) and (C3) and, in a much lower proportion, at (C1). However, beyond the three groups observed in the study, tutors reported a strong contingent of unapprenticed adult students engaged in full-time and day-release plumbing training across the three college sites. Therefore, full-time plumbing courses provided a pathway for younger students to prepare for apprenticeships, while facilitating second chances for the unapprenticed adult students who were seeking new careers.

The majority of tutors across the three sites suggested that adult students often took up the full-time courses as a means to a 'second chance' career or as an alternative means of entering the plumbing occupation to that of employed apprenticeship. These second-chance students were reported by the majority of tutors at C1 and, to a lesser degree, at C2 and C3 as taking up full-time training so that they could set up their own business:

*The vast majority of our adult students come in to run their own business; they want to have the freedom of being self-employed...With our adult learners, it's almost like they are getting a second chance. (tutor Mike C1)*

Most tutors aimed to be positive about the prospects for full-time plumbing students, but their positive outlook seemed to be conditional on full-timers getting a job:

*I think we have to try to be positive, to try to encourage full-time students, because ultimately that is what we are about...Then they can make that switch over to the NVQ and become fully qualified plumbers. So, hopefully, they are running in tandem, so they can make that switch as soon as they do get a job. (tutor Larry C1)*

In relation to this issue, tutor Mike (C1) added that adult students

*have the chance to undertake one of these courses and, within this area, we have a very high conversion rate over to NVQ. (tutor Mike C1)*

Tutors wanted their students to enjoy some success from the courses, to grow in confidence and progress to employed or self-employed status. The full-time plumbing courses provided opportunities for those students who were lacking employment and family connections in the trade to get an apprenticeship. In this sense, these tutor comments provide some evidence of the colleges' responses to the challenges of widening participation, flexibility and inclusive provision. It seemed as though opportunities were being created for a range of students with diverse aspirations to learn and develop skills in order enter the plumbing occupation. They could complete the technical certificate in college, but needed an employer in order to do the NVQ switch over or conversion.

However, it was apparent from the responses of some tutors that there was confusion associated with students' understandings of the relationships between technical certificates and NVQs:

*...we have made it perfectly clear, right from the beginning...what the technical certificate is; what the implications of not getting an NVQ are. We point all that out, in induction and also after the first six weeks or so; we do the industry module, and we point all of that out. We give it the day-release, so they know what the difference is between the tech-cert and the NVQ level 2; we make that perfectly clear. (anon)*

It can be discerned from the defensive tone of the statement above that there was sometimes confusion amongst those undertaking college courses in plumbing. It also seems apparent that tutors had some responsibility for communicating the terms and conditions of plumbing courses, which seemed more akin to describing the 'buyer-beware' limitations of the course rather than the potential advantages.

In terms of student perceptions, Jess (C2) and Cathy (C2) were two adult students who had chosen to learn plumbing through participation in a 'women in construction' course. Both had completed the NVQ level 2 and had secured employment with plumbing firms in order to progress onto the level 3. Cathy said:

*I rather decided that I liked doing plumbing. (Cathy C2)*

She enjoyed her job but, to her disappointment, had been laid off through no fault of her own. Cathy was committed to continuing her studies via a Technical Certificate 3 in college, but needed employment or self-employment in order to gain the NVQ. This required a work placement, on-site portfolio of evidence and work-based assessments. Cathy was enthusiastic about plumbing and explained how the college course had improved her confidence:

*...it gives me the underpinning kind of knowledge and experience to know vaguely what you are doing before you go out into the workplace. (adult student Cathy C2)*

Jess had different motivations. She was an interior designer by profession and had a diminished view of plumbing installation standards prior to the course:



*I have done barn conversions and the plumbing was atrocious and I thought to myself, I have got to learn more about this. (adult student Jess C2)*

Jess had worked in the domestic construction sector and her perception of the plumbing industry reflected some of my own concerns in relation to the quality of workmanship reported in the introductory chapter. Her motivation to learn plumbing was a way of extending or enhancing her existing knowledge and skills, which would help to serve her future enterprising.

In the case of adult student Jason (C3), he had been undecided about plumbing at the age of 16 and had turned down an apprenticeship opportunity. Now in his mid-twenties, Jason had been working in the plumbing industry intermittently for a total of about five years in the decade since leaving school, with his plumbing work sandwiched between periods of employment in factories. Adult student Gary (C3) had a similar story in that he too had declined a plumbing apprenticeship opportunity at a younger age:

*From being made redundant from painting cars, I was doing little jobs here and there and decided to go with my dad, which I should have done a long time ago. But, being younger, all I wanted to do was work on cars, so I did an apprenticeship in that and then I thought I just can't pass this opportunity up again and not take it. (adult student Gary C3)*

Spaces of opportunity had opened for both Gary and Jason through day-release training in college while being employed in the plumbing sector. Gary had a vocation for painting cars, but it was economically constricted. However, he had responded to the challenge of redundancy by embarking on a new career. In Jason's case, he had been working as a plumber for five years, but did not have any formal qualifications. The opportunity to study was significant in the way Jason felt about moving on from past regrets and securing his family's future through the prospect of being qualified. His subsequent hopes were for better status, work opportunities and wages. Jason believed that college was

providing a route for him to become a qualified plumber in much the same way as Jess (C2), Cathy and Gary (C3) did (wobs adult student Jason, 19/05/2010).

### 4.3 Challenges and opportunities

Not all of the students were as fortunate as those just mentioned. Some students seemed to have faced extraordinarily difficult challenges in finding suitable work experience and in securing an apprenticeship. Oz (C2), for example, was an apprentice who told of his full-time preparatory plumbing course status prior to gaining his apprenticeship. In contrast to many of his apprentice peers, when he was a full-time student, he did not have the relevant family networks to assist his employment prospects. Like many other full-time students on plumbing courses, he was desperate to find work in the form of an employed apprenticeship, but received a poor response from his job applications:

*I must have sent off at least 50 letters and I had six replies and they were all saying they were sorry, and you think, 'What is the point! No-one is going to employ me'. Then, luckily, someone came to the college and I got it, work experience for two weeks. (Oz C2)*

At the time, Oz was delighted to have 'luckily' attained two weeks of work experience, which gave him some hope of future employment as an apprentice. However, in regard to his preparatory training, Oz was positive in saying:

*if I didn't do it, then I don't think I would have the apprenticeship I have now. (Oz C2)*

Other students also experienced this apparent lack of 'luck' in their applications to become apprentice plumbers. Indeed, tutors across the three sites expressed varying levels of concern in regard to the relevant job prospects for their full-time students. Their tales reflected some of the socio-economic concerns that were touched on in the introduction chapter, concerning youth unemployment and a rising demand for plumbing courses:

*...we had two full-time groups and this year, we have the potential to have four full-time groups. So the interest in plumbing I think, this year, was the highest intake ever. (tutor Kim C2)*

With regard to the number of plumbing students and apprentices, tutor Mike (C1) stated:

*At the moment we've got round about 350 on the books. (tutor Mike C1)*

He suggested that other FE colleges in the county had similar numbers of plumbing students, with the majority of plumbing students doing full-time training rather than apprenticeships. Tutors across the three college sites were generally concerned about the challenges that full-time students faced in finding apprenticeships and employment:

*I have got 24, level 2, full-time students doing a City & Guilds course...I have had them for two years and out of those 24 looking to complete... none have got jobs. (tutor Bill C3)*

*I think there is a question about morality really. I find that we are being forced to take full-time students and relate them to a course when there isn't a job at the end of it. (tutor Gordon C3)*

In regard to his students' progression into employment via a full-time plumbing course, tutor Bill (C3) said:

*That is my biggest concern. (tutor Bill C3)*

Tutor Gordon (C3) explained that they

*get a large cohort of students every year, (tutor Gordon C3)*

but that only a few progressed to employment as apprentices or plumbers and the

*rest of them I see in Tesco or in a shop. (tutor Gordon C3)*

Tutor Norman (C3) said:

*You are leading them up a garden path. (tutor Norman C3)*

This may be understood as his belief that

*students were being pointed in the wrong direction, (tutor Norman C3)*

or being misled.

Some tutors at C1 and C2 and the vast majority of tutors at C3 suggested that preparatory plumbing training of both younger and adult students was driven by funding issues:

*We were forced, and that is my view, to go down a full-time route, which was dictated to us by funding issues. So, we had to bring in more people on the full-time to incorporate money if you like. (tutor Gordon C3)*

*There certainly seems to be a drive to take on more full-time students now...I've been told that it's the funding, that's where government are placing funding...there are probably political undertones to that as well. (tutor Larry C1)*

However, many of the tutors at C1 and C3 and, to a lesser extent, at C2 had accepted that they were part of a wider strategy, which sought to deal with issues relating to youth unemployment:

*A lot of it is down to government legislation and they got to be seen to be doing something with these youngsters, the 14 to 19s. (tutor Norman C3)*

*...but it keeps them off the street, they are doing something. (tutor Darrel C3)*

*You know that these youngsters are actively encouraged to do something at college to improve themselves. That's just the way forward for most youngsters. (tutor Larry C1)*

Many of the tutors across the three sites indicated that preparatory types of training had some advantages for young people. It appeared that the tutors were wholly committed to caring for their students, even if they had little discretion in the matter of student recruitment and the careers advice that students received and could do little to stem the disappointment, which they felt was inevitable for some at the end of the course:

*With our younger ones, they hang around in education until they decide what they want to do. In the meantime, it's a holding place for them and that's the most soul destroying part of it. (tutor Mike C1)*

*...it's not setting them up for a fail, it's just setting them up for a disappointment. (tutor Kim C2)*

*The scary thing is, is that they have three years of free education and they might lose or waste two on a job that they are never going to do. (tutor Darrel C3)*

Owing to the scale of uptake in plumbing courses, the majority of tutors at C3 and, to a lesser extent, at C1 and C2 thought that the full-time plumbing course was probably a questionable direction for many of their younger students. Moreover, there was the implication that socio-economic issues of youth unemployment were being served, which did not necessarily benefit the best interests of younger students. Conversely, adult students on both full-time and day-release courses were reported as seizing the opportunity to learn occupational skills and gain qualifications. Many of these students were described as enterprising in becoming self-employed and converting their technical certificates to NVQs in the workplace.

#### 4.4 Some consequences of full-time plumbing courses

The research data lead to the conclusion that the increasing demand for plumbing training had been particularly disadvantageous for those undertaking the full-time plumbing courses because this was where the opportunities for conversion and apprenticeship were disappearing from. As mentioned previously, Oz (C2) had written 'at least 50 letters' and thought at one point, 'No-one is going to employ me'. Cathy (C2) was also looking for work in order to attain the NVQ3 qualification, in which she had invested more than three years in work and at college. Connor (C2) had invested over two years of his time in college and needed a work placement to convert his college-based technical certificate to an NVQ2 in order to progress to NVQ3. He was more successful than some of his counterparts as he managed to secure an opportunity through the procurement of unpaid work experience through a plumber who was friend of his father. I asked Connor how long he had been working unpaid and if he had ever asked his employer for wages:

*No, I don't like to ask him really. I needed a work placement to come on this course to carry on, so...it's probably about six months...nine till about five. (Connor C2)*

Connor (C2) explained that his employer's business situation

*had slowed down to what it was, so he is probably finding it tough at the moment. (Connor C2)*

But even despite working long hours for no pay, Connor did not speak about his employer in a derogatory way, nor did he blame his employer for the unpaid labour situation. Connor had 'needed a work placement...to carry on', so had traded his unpaid labour for his qualification opportunity. Connor sympathised with his employer's perspective in that his employer had offered the work experience as a favour to Connor's father. Although Connor's employer was not paying wages, he was helping his friend's son to complete his NVQ2 and progress to NVQ3, which is something the college had failed to do. Connor's difficulties in obtaining an apprenticeship that paid him were accompanied with

other forms of economic hardship. Connor was no longer entitled to Educational Maintenance Allowance, which was a small weekly payment made to full-time students during preparatory training. Consequently, it was difficult for him to buy books for his apprenticeship training at NVQ3. Connor explained that he was reliant upon his parents for support:

*Mum and dad help out as much as they can, because they are on low income as well. It's a struggle for all of us. (Connor C2)*

Charlie (C3) was also a graduate of a preparatory vocational course and, despite having a number of relatives working in construction, he too found some difficulty in securing employment:

*First of all, I tried looking into it through the army careers; they do a three-year apprenticeship in the army. But my parents weren't really too fond of me going away in the army. But it's gone on from there really, and my uncle managed, in the end, to take me on. (Charlie C3)*

Charlie's uncle 'managed, in the end' to take him on when faced with his nephew considering the army, which was a career choice his parents 'weren't really too fond of'. The situations of need for both Connor and Charlie may help to explain why so many families and friends were reported in this study as willing to help technical certificate graduates to find work placements. There were large numbers of full-time candidates on college courses wishing to progress to NVQs, which were described by tutors as *the* industry-recognised qualifications. Without the work placements and subsequent work assessments, the industry-recognised NVQ was not achievable. Therefore, graduates of the technical certificate had staked considerable time and effort in a college enterprise that seemed to offer more opportunities at the beginning than at the end. These full-time plumbing students were not only looking for work, they were also looking to complete a qualification in order to salvage some value from the two years of preparatory training they had undertaken.

## 4.5 Discussion of the data

The data presented in this chapter have worked to outline both the students and the tutors' routes into plumbing (both in terms of training and of their transitions to work). The retrospective tutor accounts provided an interesting perspective on how things were considered to have changed in relation to plumbing and plumbing education over time. The stories told here chime with wider neo-liberal narratives reported elsewhere, where young people are considered to face a high degree of uncertainty and risk in contemporary times, and where they might feel compelled to make their own destinies, regardless of their difficult socio-economic circumstances.

Interestingly, however, this did not seem to be an entirely individualist affair. Families and social networks provided the all-important capital for these young people to get ahead and to get the relevant experience, which might help them to gain their qualifications. In fact, the tutors' comments seemed to suggest that this was a relatively new approach to gaining apprenticeship training and something that had not been needed in the so-called good old days, when jobs were perceived as being for life and as paying good money. Despite the practical and financial difficulties that many of the students faced (especially those on full-time college courses), they tended to stay positive about their experiences and held out hope for their future employment. These findings are congruent with aspects of Ofsted's (2012: 26) study 'Ensuring quality in apprenticeships', which reported that 'eighty-nine per cent of the 500 respondents to the online survey agreed that their apprenticeship lived up to their expectations and they would recommend it as a good way of gaining qualifications'. The plumbing students and apprentices in my study also looked back on their occupational lives in a positive way, seeing their routes into the profession as relatively inevitable owing to the fact that it both catered for their preferences (practical rather than academic work) and helped them to realise some of their childhood aims.

Whilst it is important to remember that these stories are not necessarily representative, it could be suggested that they provide the detail necessary to understand why it is that students come to take up different training routes in



relation to plumbing in the first place. Perhaps most disappointingly, the data in this project work to highlight the fact that the flexibility contained in these routes might have done little to challenge the disadvantage that many of the young people brought with them to their training courses. It seemed that it was those young people who were most socially and economically disadvantaged who were most likely to go into the training routes that were less stable and less assured to lead to employment opportunities.

Indeed, from what the tutors said, there was little hope of any of the students achieving the stability associated with a job for life or the wealth that they expected from this well-respected occupation. This was even less assured, however, for those who came from less privileged backgrounds in the first place, namely those who did not have the correct family capital to get ahead and gain an apprentice placement. The data in this chapter lead to the conclusion that some serious work might still be needed to ensure that young people are entering plumbing courses with realistic expectations of what they might achieve. Furthermore, that young people and adult students might be adequately supported in finding subsequent employment or work opportunities in order to learn and progress.

#### **4.5.1 Comment on the policy context**

Reflecting on the policy context in which this study took place, it is important to note the significant changes in funding and marketing brought about by the '1988 Education Reform Act' (see Huddleston, 1993: 172). For England and Wales, this act led to colleges becoming independent in 1993 and in control of their own budgets. Richardson (2007: 409) commented that 'in place of the local authority workforce, the incorporation of colleges has led to the mushrooming of a secondary labour market of "learning and skills sector" workers based in national and regional state agencies, alongside a constantly shifting pattern of lobby groups and sectoral organisations representing the "needs of employers"'. The Leitch Review (2006) promoted such expansion in the learning and skills sector to address skills shortages and gaps and this was used by training providers and colleges to imply there was a demand or need for more skilled workers.

The Connexions service was set up in 2001 to help Labour achieve their policy aims for growth in skills (Rainbird, 2006), and FE colleges along with private training organisations reacted to this supply-side policy context by looking at ways in which they could cash in on this growing learning and skills market. However, from the outset of the colleges' involvement, Raggatt (1994: 71) warned about 'identifiable tensions between educational objectives and commercial ones' in terms of the 'business' of college-based vocational training where 'there is a clear danger that commercial objectives will dominate and the broader goals of education will be squeezed out'. This commercial supply-side approach is exemplified both in the findings of this chapter and more broadly in Table 1.1, which shows that, from 2005 to 2010, 220,920 plumbing-related courses (at levels 1 to 3) were publicly funded to feed an employer demand of only 22,165 plumbers and heating engineers over the same period.

However, it can also be argued that these findings provide some evidence that the Labour government's flexible and inclusive strategies and policies (1997–2010) had some measure of success in their attempts to reduce the number of 14–19-year-old students becoming disaffected, disengaged and dropping out. In addition, opportunities for workforce development through vocational education and training have arguably been provided to some adult students, such as those described in this study. Nevertheless, despite the commitment of successive governments towards the task of increasing apprenticeship numbers, many unapprenticed full-time plumbing students and some apprentices in this study faced extreme difficulties in finding opportunities for steady employment and progression. Even for apprenticeships in plumbing where steady employment was often assumed, a number of students in my study had diverse and insecure employment arrangements despite being referred to as 'apprentices'. Such 'apprentices' were working as unpaid volunteers or as part-employed or self-employed, which is a situation reported more recently by Ofsted (2012: 5-6):

*Too many apprentices did not have real and sustained employment during and after their apprenticeship. This applied to a quarter of the apprentices in the subcontracted providers visited...Just over a third of*

*the 500 apprentices responding to an online survey did not consider themselves to be holding a permanent job during their apprenticeships.*

Such difficulties faced by apprentices and students in finding and securing steady employment arrangements stood in contrast to the reports of skills shortages, skills gaps and high wages, likely to be expected by many who were entering the occupation.

The next chapter examines the students' experiences of plumbing education, both in college and the workplace. The chapter will focus on the students' and tutors' concerns that this education was often divided into the theoretical and the practical and that this dislocation was extremely hard to overcome.

## **5 Perceptions and experiences of the divide between theory and practice in plumbing education**

### **5.1 Introduction**

This chapter explores the dominant concerns that both tutors and students in this study expressed about the divide, which they felt existed between theory and practice. Across the three college sites, the word 'theory' seemed to be used as an umbrella term for everything in the curriculum that was subject knowledge-related and was taught in the formal classroom. Writing in 1991, Jessup made the distinction between knowledge (theory) elicited through conversation, questioning and writing and the skills that underpin competent performance (practice). The tutors and students in these colleges also talked about theory and practice in this way, taking up this binary distinction between theory and practice as they spoke about the organisation of the college and work-based learning. Their concern was predominantly that neither of these aspects could be easily reconciled, but that both were necessary for a competent performance.

This chapter explores these concerns about the theory/practice divide in relation to a number of different themes that emerged from the data. These include: the practical and financial problems that prevent their coming together; the overemphasis that appeared to be made in relation to theory in the college contexts; the lack of continuity between college teaching sessions on practice and theory; the lack of continuity between workplace practical activity and college-based theoretical learning; the advantages that apprentices experienced with regard to their extra work-based practical training and the problems that the divide caused for students without external work placements (owing to a lack of authentic practical experience and real world experience).

### **5.2 The theory/practice divide as inevitable, pragmatic and money-saving**

It was often the case that the tutors interviewed in this study would use the metaphor of 'marriage' to describe their understanding of the meaningful relationship between theory and practice:

*...if I am showing them the pure science while they are doing the practical or show them the practical while they are doing the theory in the class, it's a perfect marriage. (tutor Bill C3)*

Some tutors appeared to believe that a relationship between theory and practice in the curriculum was one of the most important things they could provide for their students. However, they also talked about the way in which this task could prove impossible. Still utilising this marriage metaphor, they spoke of how it was more common for these two aspects to be divorced from one another:

*...we have two systems that are divorced of each other... it doesn't go hand in hand. (tutor Tim C1)*

Tim (C1) spoke of this alignment as

*virtually impossible, (tutor Tim C1)*

and this was something I witnessed during my observation of sessions in the three colleges. Indeed, at all three college sites, the teaching sessions appeared to be separated into those that focused on subject knowledge (theory) and those that allowed for real practical training (practice). Tutor Terry's comments reflect the sentiments of most of the experienced tutors in the study in that little had changed in this respect in the previous three decades:

*We're teaching historically; it has always been a three-hour theory lesson for day-release and a three-hour practical session, and we're just doing it because it has always been that way. (tutor Terry C2)*

In addition, there were considered to be further dislocations between the practical training, which the students experienced at work, and the more theoretical training, which they received in college. The so-called theory aspects of the curriculum were delivered in modules within the colleges and each module had an individual external assessment. These taught modules

coincided with the modular-guided learning hours for the course, which, in turn, were bound by funding arrangements. The majority of tutors described how they had little discretion over the way the course was run because this was determined by the theory assessment dates, as booked by the college exams office. Tutor Darrel (C3) stated that his students had an exam every five weeks and the other colleges in the study had similarly structured arrangements:

*All my exams for my level 3 are booked for the last week of January, which is the timescale we are working to. My delivery is tuned in around that. (tutor Mike C1)*

Tutor Gordon said that

*the system dictates pretty much what we do as teachers these days. (tutor Gordon C3)*

However, this imposed division between the theoretical lessons in the classroom and the practical lessons in the workplace, caused by the modular arrangement of the college-based sessions, was not always viewed by the tutors as something that was negative. Indeed, many of them were generally in favour of the modular arrangement for the theory sessions:

*I teach very modular...It creates structure...students know what I am doing, I know what I am doing. (tutor Larry C1)*

*I like the modular approach. (tutor Terry C2)*

Many of the tutors across the three college sites felt that the predictable nature of modules actually helped them to plan their lectures and schemes of delivery, providing structure and clear aims for the students to work towards. This highly-organised structure was also reported to help them with the growing logistical issues that they faced concerning the increased demand for plumbing training. Consequently, tutors understood the pragmatic need to timetable the curriculum carefully:

*I think the only reason it is split into half a day of theory and half a day of practical is because of the facilities that the college have. I think it is easy to timetable out rooms and workshop availability because it's half and half. (tutor Gordon C3)*

As tutor Terry C2 explained:

*Sometimes we have six classes going on; we can't all be in the workshop. (tutor Terry C2)*

Students attending these sessions on the same day were split equally and rotated between theory and practice. Three groups did classroom theory in the morning, while the other three groups did practical sessions in the workshop. They then swapped over in the afternoon. This facilitated theory and practice training for the six groups of students attending college on the same day.

In addition to the logistical considerations of the planning of these sessions, the tutors also recognised that there was a fiscal issue concerning the expensive materials needed for the more practical teaching sessions (including materials like lead and copper). They explained that the training budgets had to be carefully managed and that they were working under immense fiscal constraints:

*More practical would be better, but obviously that needs money because of more resources and with all educational facilities, we have never got the money. (tutor Norman C3)*

*Practically, I think we could do a lot more. We are very inhibited by the availability of materials and monies to do that. So, I think we work under immense constraints. (tutor Gordon C3)*

This was particularly the case for those tutors at C3, who reported significant financial constraints with regard to a lack of resources, which, in their opinion, affected students' learning, assessment and progression. In one practical session, for example, tutor Darrel explicitly stated this to the class, saying that:

*today's lesson is determined by the fact there is no copper pipe or fittings to do anything else. (cobs C3, 04/05/2010)*

This problem was experienced slightly differently by those tutors working at C1. In my observations of the students in the practical sessions in this college, it was noted that they consistently wanted to work with new pieces of lead from the college store and that the tutors were concerned about their attitudes to the recycling of expensive materials (cobs C1, 30/09/2009).

On the other hand, this field extract from college C2, shows how tutors at this college managed these demands by working to simultaneously save materials and improve students' learning:

*In the plumbing workshop, I noticed a student watching a practical training video on the 'lead bossing' technique. There is a computer and monitor connected to an interactive whiteboard in the workshop, which students use to watch training videos of practical demonstrations that the tutors had made themselves. Tutor Matt says that this saves time and reduces the number of demonstrations that teachers have to perform. Tutor Alfie, who manages students' practical learning and workshop resources, comments on how much lead this also saves...Tutor Matt explains that students practice on scrap pieces of lead for training and are given new pieces of lead for their assessments near the beginning of the course. These are stored under lock and key until the students request their assessment. This process allows tutors to keep an eye on how many times a student attempts an assessment and whether more training is required. Matt explains how this process helps to monitor students' usage of materials. (cobs C2, 05/11/2009)*

### **5.3 An overemphasis on theory?**

In contrast to the varying concerns about the possibilities of adequately pursuing the practical work necessary, many of the college tutors were united in



the opinion that their theory sessions were comprehensive and suitably demanding:

*On the theory side, we do cover the whole range, so it's not too much of a problem, the theory. (tutor Alfie C2)*

There was, however, some concern that this meant that the curriculum was a little unbalanced and heavily weighted towards theory:

*...we tend to spend more time pushing towards the theory side and not enough on the practical. (tutor Norman C3)*

Tutor Terry (C2), for example, suggested that some students were not acquiring or developing the necessary practical knowledge and understanding required for competent performance because of the emphasis that was being placed on paperwork, and without the corresponding depth of practical training:

*You can be a level 2 qualified plumber and just put a boiler jig on a wall and plumbed up a couple of radiators and yet extensively gone into the paperwork, work programme and the job specification, but not really understand how a central heating system works. (tutor Terry C2)*

Here, it was felt that students at level 2 did minimal practical training and had less time to practise or apply their theoretical knowledge. A major related concern was the health and safety risks, which were seen to be associated with this supposed 'lack of understanding' caused by this imbalanced education. One example that was relayed to me was in relation to the central heating system. In this instance, it seemed that the theory sessions had covered important aspects, like 'electrically powered components' and 'control systems', but that this learning was not then transposed into practice during the workshop sessions.

Some tutors and students also suggested that the theory curriculum could sometimes place undue emphasis on issues that could be deemed less relevant in practice. A number of tutors spoke about this in relation to the general

construction aspects of health and safety training in the college curriculum, which they felt were not necessarily relevant to aspects of domestic plumbing:

*I think two thirds of the folder is health and safety, which is fair enough, but it's not plumbing. (tutor Darrel C3)*

Of course, these tutors did acknowledge the need for and importance of health and safety training but they also implied that its extensive coverage further contributed to the imbalance between theory and practice in the curricula.

It was also the case that the students interviewed in this study were generally in favour of having more practical training in the college sessions:

*I think really there should be more practical in the afternoon. I don't think we get enough practical. (Charlie C3)*

*...we have learned quite a lot on theory side, but we haven't really had enough time to cover everything on the practical side. (Sammy C3)*

Many of the student comments chimed with those of their tutors when they emphasised the imbalance caused by the overemphasis on health and safety training:

*Health and Safety went on and on and everybody knew what they were doing, but still got two or three more weeks of it before we got the exam. (adult student Gary C3)*

Adult student Gary (C3), for example, spoke of his frustration at having to undertake classroom-based health and safety training, adding that

*sometimes we have got a week to do the central heating, (adult student Gary C3)*

implying that, in the case of the latter, not enough time had been given to do this properly. Gary had worked for many years as a car body-shop worker and

had already had extensive health and safety training for that sector, some of which was transferable, but he still had to repeat the safety training in the classroom. Gary's comments were echoed by first-year apprentice Charlie (C3), who stated that

*central heating was just doing theory in the classroom. (Charlie C3)*

He had evaluated his experience of the college theory curriculum through a dialogue with his uncle-employer:

*My employer asked me what I was doing at college and how many weeks I had been on my central heating. I told him one week and my exam is next week. He thought I was joking. He thought I was messing about. But it's not enough time really, so he went through quite a lot of things with me, so it helped. (Charlie C2)*

Charlie's employer expressed some disbelief that his apprentice had only done one week of training on central heating, so he took action to help his apprentice learn in order for him to be able to operate safely in the work context. In the end, it seemed that Charlie was able to pass his theory assessment on central heating, but he did so without any corresponding practical training in the college context (cobs C3, 08/06/2010). Whilst Charlie's qualification evidence implied he had knowledge and understanding of this issue because of his success in passing an assessment on it, Charlie and his employer felt otherwise. Indeed, Charlie largely explained his success in relation to the extra tuition he had received from his employer, which had made up the shortfall from college provision. Whilst, in this instance, Charlie did not miss out, it was evident that others might have done so. Those on the course who were unemployed, self-employed or who had employers who were not plumbers (like Jason C3) would not have been able to garner the extra experience necessary for a competent performance.

#### **5.4 A lack of continuity between the theory and practice sessions at college and at work**

As well as talking about the constraints surrounding the practical provision and the overemphasis on theory, the tutors in this study also mentioned a distinct lack of continuity between the practice and theory sessions, even when they were taught on the same day. This was a concern about the timing of these sessions and the fact that what was taught in the morning did not often match up with what was taught in the afternoon:

*It would be nice to say in [classroom] theory, radiators, and they come into the workshop in the afternoon and fit radiators. It never works out like that and I don't think it ever will. (tutor Alfie C2)*

*...if they open up their practical books and it was leadwork that they were practically to do, there would be no association with what they had learned in the morning in the theory. (tutor Gordon C3)*

In addition, the tutors suggested that the design of the qualification (in terms of the practical task manual used in these sessions) did not help. This was because of its content of over sixty practical individual assessment activities that did not necessarily tie in with the taught modules in predetermined way:

*Because of the number and range of practical tasks they need to undertake in the workshop, it doesn't necessarily tie in with the particular theory module that that they are doing. (tutor Den C2)*

Assessor Luke (C2) claimed that it was

*very difficult to link the two together because of theory side on one module, then you have the practical side with all the tasks. (assessor Luke C2)*

Hence, the modules in the classroom and the performance activities in the practical task manual were difficult to tie in or integrate with one another.

It was also noted by the tutors that the students were working on these practical tasks at their own speed by simply following the book in order to gradually progress through a range of basic installation tasks at level 2:

*...hopefully they follow the book, we get the book out and they go through it. (tutor Alfie C2)*

*Normally, Larry lets us get on with it. We look at the book to see what we are doing. (Chez C1)*

The students were working individually to complete basic practical tasks in order to progress to more difficult ones. Often, in the theory sessions, the students were learning about much more advanced phenomena. This meant that the theory and practice sessions rarely linked up and that, rather than using the practice sessions to seek explanations of relationships and links between subject knowledge and practical activities, the students were using the sessions to complete unrelated practical tasks.

The students echoed these tutor concerns, as Jason demonstrates:

*It doesn't get mentioned in the afternoon, what we have done in the morning. (adult student Jason C3)*

However, the students also spoke about the discontinuity they experienced when the theory that they had learnt at college did not seem to match up with their practical experiences in the workplace. Indeed, many students reported that college learning rarely related to what they were doing at work at the time:

*Some things you learn at college don't really come into it at work. (Charlie C3)*

*[Work] doesn't always relate to what we are doing at college. (John C3)*

The students felt that the college curriculum was largely organised around the theory modules and that these were delivered irrespective of the students' corresponding activities at work. This meant that the relevance of what students were doing at college was not planned to coincide with what students were doing at work at the time. Only in some instances did students report feeling 'lucky' because they had happened to coincide:

*It just happens so it is coinciding, so when we did the cold water I was doing a lot of cold tanks...then we went to hot water and I was doing cylinders...so I have had a bit of an advantage like that, I thought I have just been lucky. (adult student Gary C3)*

Jess (C2) was also one of these students who felt that the two had coincided in a way that was relevant and helpful for her:

*Definitely, the theory certainly does and the regulations, it's that part of it — health and safety side, regulations — that really does make a difference when we are installing systems...it's just the knowledge is there to put into practice. (adult student Jess C2)*

In contrast, others, like Jake (C2), explicitly pointed out the difficulties that they faced in their understanding because of the discontinuity in subjects. Jake felt that his difficulties had been caused because he lacked the relevant work experience:

*I am doing industrial at work but doing a domestic course...I struggle with that because gas systems, I don't touch um. (Jake C2)*

Cathy (C2) felt the same way. She was unemployed and working on gas at NVQ3 level without an opportunity, at that time, to relate the college learning to the corresponding situations in work contexts. These students relied heavily on the opportunities available to them in college and so it was far less likely that they would be able to ask for extra practical tuition in relation to an aspect of theory that they were being taught. For some, the time delay was felt to cause significant problems in their understanding.

One of the perceived consequences of this time delay in teaching was the students' forgetfulness. Tutor Alfie (C2), who taught mainly practical sessions in the workshop, talked about the way in which he had to continually go over learning with students despite the fact they had often completed their taught knowledge modules and assessments:

*I have been doing things 15 or 16 times this past year... these students just come to me empty; there is nothing in their heads. (tutor Alfie C2)*

Alfie was not alone in this view either as many of the tutors across the different colleges spoke about this apparent forgetfulness:

*I don't think they retain the information for too long. (tutor Larry C1)*

*If they are full-timers, they will only bend a bit of pipe a couple of times over two years, and they forget everything they have learned in a couple of months. (tutor Darrel C3)*

Tutor Matt (C2) recalled an instance where some students had been informally questioned in relation to the technical aspects of their job. He told me that they had real difficulty in coming up with answers themselves without some sort of prompting:

*If I said, 'Which valve would you fit on that system?' and didn't give a choice, they wouldn't have an idea...when you are in the real world doing some real work, you don't get four options. (tutor Matt C2)*

## **5.5 The impracticalities involved in linking theory and practice in teaching**

In the research interviews, many of the tutors spoke about the barriers that they faced in attempting to bring together theory and practice in their teaching. Tim, for example, like many of the other tutors interviewed in the study, was concerned that he should do more to make this work for his students. However, he was quick to point to the barriers that he faced in doing this, suggesting that

it was very difficult to achieve when there were such high student numbers in relation to teachers:

*During the practical elements we should talk theory to them, but this is very difficult when we have big classes. (tutor Tim C1)*

Large group sizes affected the available time that tutors had to teach owing to a large difference in the teacher/student ratio. For the groups observed in colleges C2 and C3, the group size averaged 14. The teacher/student ratio in the classroom was 1:14 for teaching one module of subject matter to 14 students. In the workshop, the teacher/student ratio was also 1:14, but students were all doing different tasks. In addition, tutors were continually training and assessing and each student required signatures and sometimes photographs of their practical projects. Students needed help from tutors to arrange their portfolios of evidence, which required write-ups of practical tasks and activity records:

*A level 2 group are mostly assessment-based and then we will be training and assessing all day long...I am continually flat out with it all. (tutor Alfie C2)*

*...it's a blur, as soon as we get in the workshop, on average, we have got four minutes with each student...and that is not enough time to teach them properly. (tutor Ron C1)*

Ron's assertion that there was not enough time to teach students properly emphasises the fact that these students often needed to learn new skills (such as welding, pipe bending, types of jointing and electrical wiring), which they were not necessarily undertaking at work. If students were inexperienced, such as full-timers or apprentices who had narrow work roles, then tutors had to spend more time training them, which consumed their time. Hence, tutors had less time to make links between theory and practice for the students' benefit.

Workshop space and facilities included welding bays, simulated roof structures with chimneys, work-benches, simulated bathrooms and tools such as soldering



and welding equipment. The facilities had practical limitations in terms of the numbers of students they could accommodate working on different tasks at the same time. It was most likely that, for most students, subject knowledge taught in the morning did not link up with the practical activity in the workshop session that followed:

*...you can't run all the students on one task to link with their theory, you would just need a massive workshop for that; there is no way we would ever have the space to do that. (assessor Luke C2)*

*In the sizes of the classes that we do...it would be nice to link the theory with the classroom but, in the real world, unless you have 15 of everything, you know you can't do that. (tutor Terry C2)*

However, it was observed that the tutors' duties for teaching plumbing theory and taking practical sessions differed between the colleges. At C1, it was the case that the same tutor taught both theory and practical sessions for a particular group. At colleges C2 and C3, different tutors were deployed to teach the different sessions. Tutor Ron said that those teachers who delivered both theory and practical sessions for the same groups were in a better position to mediate links between theory and practice for students' learning:

*...as long as you can deliver the theory and the practical...you can show how [theory] is achieved in the practical; you can't do that in a theory lesson. (tutor Ron C1)*

Tutor Ron knew what subject knowledge he had taught to his students in the classroom sessions and, despite the lack of time he had, he suggested that he could use the practical sessions to help students make links and develop understanding.

Yet, in contrast to tutor Ron's situation, the most common arrangement was for a group of students to have different teachers for theory and practical sessions:

*...it was different teachers so they did not know what was important.*

*(Jake C2)*

*Having been at the college three, maybe four, years now, we have had a multitude of teachers or lecturers with the theory and the practice. (adult student Cathy C2)*

Only a small number of tutors suggested that they spoke amongst themselves in order to ascertain what they were both teaching. Tutor Den (C2) addressed this issue when he stated that he thought more work needed to:

*...be done on the coordination of what's actually being taught in theory, and then what is actually being taught in the workshop. (tutor Den C2)*

Tutors across the three college sites were overwhelmingly in favour of this suggestion. They expressed a real desire for a coordinated curriculum to be developed:

*Whatever is taught in the morning should be put into practice in the afternoon, so they can relate one against the other. (tutor Norman C3)*

*I would like to go down to a theatre or classroom facility within the workshop where we could discuss some theory about a particular subject and then almost immediately go and practise that ideal...So, we would talk a little bit about theory, then go and practise it and then go and learn it that way rather than have three hours of theory that is predictable and then three hours of practice that doesn't necessarily relate to the theory that is covered. (tutor Gordon C3)*

*...the perfect way would be to encompass a lot of theory into practical activities in the tasks that you have in the task book...The perfect solution is for us all to have one of those workshops, with all our stuff set up...and teach in that workshop...that's the best resource we got, is the workshop. (tutor Terry C2)*

Of course, the tutors regarded these aims as idealistic. Whilst they were keen to see them come to fruition, they were aware of the real practical limitations that meant that this was often not possible.

## **5.6 The importance of realistic learning environments and worldly experience in practical learning**

As well as suggesting that there was often a lack of practical training opportunities available to students at the colleges and that even when these were provided, they were often not offered at the right time, the tutors also suggested that there were problems with authenticity and the realistic nature of these practical activities. Their concern here was with the realistic learning environments (RLE) provided by the college. The rationale behind the RLE training in college is to equip people with skills and knowledge that can be transferred by the students into work contexts sometime in the future.

Therefore, these RLEs could be considered an essential part of the vocational training offered in the college contexts, and as central to the process of preparation for work.

In describing the practical curriculum, Tutor Tim (C1) stated that there were 63 practical assessments to be undertaken in college workshop sessions by candidates at level 2. Many of these activities were basic measuring, cutting and jointing exercises, which were recorded in a practical task manual and signed off by the tutor, who was usually responsible for plumbing training and assessment in college. Tutor Matt (C2) described some of these practical activities in regard to what he considered domestic plumbers needed to know and do:

*...there are a lot of tasks that are nothing to do with plumbing. Making a square of plastic pipe means nothing...I don't think you walk away from it thinking that you know a lot about plumbing. (tutor Matt C2)*

Some, like tutor Matt, felt that these practical activities were not real enough experiences for the plumbing trainees. They were concerned that this might be

the only 'real' plumbing that the full-time students experienced because they did not get to see practical activity outside of the workshops.

However, many of the other tutors also expressed concern over how realistic the workshops were:

*...there are a lot of board exercises, a lot of measuring, which needs to be done, but in those exercises there is nothing real about them. (tutor Matt C2)*

*They hang a radiator and then they do an assessment at the end in a workshop environment, not real work. Similarly, other practical assessments are putting in bathrooms suites and airing cupboards in simulated environments. (tutor Tim C1)*

Indeed, the tutors explained that these college tasks were 'non-live' in the sense that they were often disconnected from electrical and water supplies and that there was no wear and tear or corrosion present, which would regularly be found in the work context. I was told, for example, that these college candidates would not have to find pipes under carpeted floors or determine their routes around buildings, nor would they have to get around obstacles:

*College exercises in the workshop are not real-life exercises; they are simulated. Everything is nice and level and flat. There are no problems, it's all there. It's like I said, when you get into the real world and you get into someone's house, it's completely different. (tutor Darrel C3)*

Tutors across the three college sites described the differences between simulation in college and the demands of real-world work contexts. Tutors across the three sites posited the workplace as being furnished with problems to solve and, as such, was the authentic context for learning plumbing because of the unexpected nature of work activities. According to tutor Larry (C1), the work of plumbers was comparable to that of engineers because both were involved in problem-solving:

*I consider we are now engineers. If you look at the definition of an engineer, it is someone who solves problems and that's what plumbers have to do on a day-to-day basis. (tutor Larry C1)*

Day-to-day plumbing work was described by the tutors as opportunities for problem-solving. These were tasks that required serious deliberation on the part of the plumber. In contrast, the practical exercises presented to the students in college were felt to be lacking in this respect. There was very little opportunity for these college students to deal with the uncertainties that they would face in the world of work and, as such, the tutors felt that students might not be adequately prepared to deal with the demands of the real world of plumbing.

Moreover, some tutors pointed out that the college workshop activities lacked the demands of the workplace in terms of the inherent pressure to get the job done quickly and competently:

*We can simulate it well, but you don't actually get that feeling of the pressure on you to get the job done. (assessor Luke C2)*

In the workplace, apprentices and adult students were presented with problems and they were under pressure to find a solution. They were often challenged and had to deliberate and act intelligently. Conversely, in college, the practical assignments were described as not very challenging and, consequently, not stretching the students' capabilities. Tutor Matt (C2) made a distinction between the knowledge required for the qualification and that required in the real world experience of being a plumber:

*The qualifications — you are not a plumber with that knowledge. You can pass those tests, but you are still not a plumber, in my opinion, until you have been out in the real world and worked in a number of different situations and scenarios. (tutor Matt C2)*

## 5.7 The inequalities students experienced in relation to practical training

Tutor Den (C2) explained that these problems (relating to the unrealistic nature of the practical activities at college) were a result of the course design, which was always based on the assumption that the candidates were working within the industry. As has been noted previously, however, this was not the case for a number of students attending these colleges (because of their unemployment, self-employment or full-time attendance at college). The tutors described these students as disadvantaged when compared to the apprentices:

*If you look at the full-time student, they are coming into college three days a week and getting no site experience. (tutor Larry C1)*

*...they are not learning an apprenticeship, they are learning the little bit that we are showing them especially our full-timers. (tutor Alfie C2)*

Tutor Gordon (C3) went so far as to say the full-timers were being placed at a 'huge disadvantage' (Gordon C3) because of their lack of opportunity to experience a realistic learning environment in the workplace. Consequently, many tutors suggested that full-time students had to work much harder to make sense of the subject matter in both practical and theory sessions:

*You've got to put a lot more thinking into full-timers. (tutor Darrel C3)*

*It does make it difficult to train people who are not in the trade. (tutor Tim C1)*

Tutors often referred to the difficulties that full-time students had when learning plumbing. Full-time students were said to have had no prior experience to relate to or reflect on and tutors regarded this as restricting their ability to identify, imagine and understand the subject matter in a curriculum in which they only had simulation to relate to:

*There's no projection of what work is like and that is the problem with the majority of students that we have got. (tutor Mike C1)*

*...particularly with the full-time student that comes here, that they cannot call on any experience. They cannot relate to a problem, because they have never experienced it on site. (tutor Gordon C3)*

In contrast to their perceptions of full-timers as disadvantaged in terms of learning, the tutors viewed apprentices as capable of performing, understanding and relating to the curriculum due to their regular access to practical activities at work:

*When you do scenarios, the apprentices can relate to it...because it is what they do everyday. (tutor Darrel C3)*

*Apprentices will complete a lot faster because it's stuff that they have come across before. (assessor Luke C2)*

The role of workplace experience in helping apprentices relate to subject knowledge was described by tutors as central to students' developing meaningful knowledge and understanding. With regard to the apprentices, tutor Alfie (C2) asserted:

*They're being trained how it should be done. (Alfie C2).*

Tutors suggested that this workplace experience was essential to competent performance and consequently to candidates being able to grasp and relate to aspects of the knowledge curriculum.

Indeed, the majority of apprentices and adult students concurred with their tutors in their perception of what constituted a realistic learning environment for plumbing. Tasks like cutting floorboards and dealing with the unexpected were activities that were described by students as missing from the simulated elements of the college curriculum:

*...cutting floorboards, or I had a wall fall down...things like that you find out in the workplace, that you just don't come across in college because it's all set-up for you. (adult student Cathy C2)*

Other limitations of the college curriculum were communicated by Jason (C3), who said the nature of the jobs he did at work were mainly associated with installing whole-house carcass pipework (first-fix) and the fitting of sanitary appliances and boilers (second-fix). However, he stated:

*I have not done any of that in college as of yet. (adult student Jason C3)*

In college, plumbing students were introduced to the different jointing and bending techniques through small-scale board exercises, but they did not install full working systems on different levels of a building, which are often characteristics of both domestic and commercial plumbing systems. Therefore, the everyday challenges, problems and pressures of work associated with whole-house installations were seen by the students as missing from the college curriculum.

## **5.8 The perceived advantages of workplace experience**

The limitations of the college curriculum in helping students learn were apparent in the way the majority of apprentices described how they preferred workplace learning to college learning:

*I learn more in the workplace than I do at college, I prefer being in the workplace. (Connor C2)*

*I believe that working with an employer on site is a lot better, you learn more than what you do at college. (John C3)*

*I think the best learning is what you get on site. (Oz C2)*

In support of the tutor comments, apprentices and employed adult students reported how their experiences at work helped them understand aspects of the



subject knowledge curricula. Adult student Gary (C3) described how his experience at work had helped him with a classroom topic on cold water cisterns:

*I've fitted it. I know all the parts. I know what they do. I mean, I was the first person to say it in the class. No-one else knew what a byelaw 30 kit was. Because I have fitted it and worked with it, I know what is going on. (adult student Gary C3)*

John (C3) also valued workplace learning as a place to

*see it while it's working. (John C3)*

John's comment highlights other limitations of the college simulations in that many were non-live, static and often not working for reasons of electrical and gas safety. John explained how his employer and work experience had helped him to grasp and make sense of his classroom, paper-based learning:

*...when you read it, you think you have understood it, but you go to do it with your hands and it is totally different from what you thought it was on the paper. (John C3)*

This requirement to locate the theoretical learning within a practical activity was also described by adult student Cathy (C2), who had experienced college theory both with and without a work placement. However, in her current unemployed situation, she emphasised the importance of realistic learning environments to the learning of plumbing because she was struggling to understand some aspects of the college theory lessons:

*I think I would probably find the theory easier if I was out in the workplace doing it. Some of the bits of it seem to have no meaning whatsoever...you can read something but not necessarily understand what you are reading until you go and do it in practice. (adult student Cathy C3)*

Cathy's comments reflected the problems faced by other full-time students who were learning plumbing without regular access to workplace experience. Her comments captured what the tutors were trying to explain with regard to the importance of having work experience that corresponded to students' learning and making sense of plumbing subject knowledge taught in college classrooms.

Adult students and apprentices valued work experience as a means of understanding and knowing about plumbing. In many of the cases reported by tutors and students, work experience was considered a key characteristic of apprenticeship learning and an essential means for helping students to make sense of the plumbing curriculum learned in college.

### **5.9 The problems experienced in work-based learning situations**

Even though the tutors and students were keen to champion the benefits of work-based placements and the practical experiences that they could offer, they would also sometimes talk about the problems that they experienced in relation to them. One of the main problems that these students experienced in their work placements was that they presented them with issues, which they just did not know anything about and which the college could not have been expected to train them for (at least, not without real practical difficulty). The placements that some of these students were involved in were in sectors demanding a set of skills not covered in the related college training. The students and tutors seemed to raise this issue as a way of questioning the suitability of some placements. Curtis (C1) and Jake (C2), for example, worked mainly in commercial plumbing contexts, which often demanded different types of skills and knowledge to those undertaken by apprentices working in the domestic sector. It was part of Curtis's job to inspect industrial boiler rooms for leaks and, as a result, he had learned to identify different types of commercial components that were not covered in the NVQ2 curriculum he was doing in college. In addition, the leadwork that Curtis was doing at college when I observed him did not easily relate to the plumbing and heating maintenance in commercial buildings he was doing at work at the time.

During my work observations with Jake (C2), he discussed his technical knowledge relating to the aspects of work he had experienced in his own commercial work context. Jake seemed to have extensive knowledge of commercial pipe-jointing processes, which were only really relevant to the types of work he was undertaking whilst in employment. Jake had no hesitation in clearly explaining the process of jointing lengths of industrial poly-ethylene gas mains, which significantly enhanced even my own knowledge! (wobs Jake, 09/03/2010). Jake had learned this jointing process at work and recited the details without the need for an instruction manual. Therefore, he had the ability to discuss complex, technical aspects of the job, which were relevant to him at work. However, it became apparent that these experiences were divorced from those he practiced or learnt about at college. This might therefore raise some questions about the suitability of his placement and the possibilities that existed for combining the lessons he was learning in the two different contexts.

Apprentice Brent was an NVQ3 student, whom I accompanied at work while he undertook a range of plumbing jobbing duties in domestic dwellings. He was 19 years of age and highly competent at what he did, which was part of the reason he was assigned his own van and trusted by his employer to work alone. He worked unsupervised on domestic tap repairs and minor plumbing installations, such as replacement immersion heaters (where the electrical connection had already been isolated by a competent person). I observed Brent on some minor jobs involving work on electrical central heating components and an electric shower. He diagnosed and fixed the shower and he installed the central heating pump, both to the customers' satisfaction, providing some evidence that he had the skills to produce satisfactory outcomes. In conversation with Brent, he disclosed that he was dyslexic and preferred working and learning in a practical way. His father was an electrician and Brent told me how he had learned at home with his father, fixing electrical machinery and appliances. Brent seemed confident in his knowledge and attitude to working with electrically-powered components. However, in some instances (e.g. safe isolation procedure), it was apparent that Brent would have benefited from some advanced electrical training in the college context to extend his existing knowledge and electrical competence in the work context (wobs Brent, 10/03/2010; Brent, 23/03/2010). In this instance, it was likely that Brent would receive this electrical training on

plumbing components as part of the NVQ3 programme, but at a later stage in his studies at college. For Brent too, therefore, there was discontinuity between his college and work-based learning because, at the time, Brent was only learning about gas work.

In the case of adult student Jason (C3), he had no formal qualifications in plumbing, but had over five years' experience working as a plumber. He mainly undertook plumbing and heating installation work for his employer and was conscious about his own levels of competence and training requirements:

*...at the moment, I don't go around to peoples' houses and I don't try and solve problems. (adult student Jason C3)*

Jason was aware of his own training needs and this was one of the reasons why he was motivated to attend college to learn more about the advanced technical aspects of the job, which he had eschewed in his younger years. Jason had limited supervision from subject-specific mentors at work, but he was expected to provide the plumbing, heating and gas installation for the conversion of a large single property into eight flats. Jason's employer consulted a qualified gas installer, who did periodic inspections and the final tests, which included commissioning the boilers that Jason had installed. However, the job required a level of competence and knowledge that was more in keeping with an advanced plumber or technician at NVQ3 level, whereas Jason was only in the first year of his NVQ2 at the time. He therefore required advanced skills and knowledge taught at NVQ3 level, but was destined to go through basic training at level 2 because it seemed that his prior learning and abilities had not been assessed (wobs Jason, 24/05/2010).

These observations of Brent's and Jason's experiences lead to the conclusion that even when it might be possible for links to be made between work and college-based learning, this often cannot happen at a convenient time. This demonstrates the difficulties that even these more privileged apprentices experienced in relation to practical training. Just because they were able to gain practical experience through their placements, this did not mean it would be relevant to what they would learn in college or that the two could coincide. At

times, the work-based placements could even be seen to be more of a curse for the students than a blessing. They were important for the experience they offered, but they were potentially dangerous when they forced them to undertake tasks for which they were not trained and which exceeded their abilities at the time.

### **5.10 Discussion of the data**

This chapter has demonstrated the significant concerns that were raised by both tutors and students in relation to the theory/practice divide, which occurred in their training. It was suggested that many of the participants were in favour of overcoming this divide and that some even felt that the ideal would be for the two components to become married in a combined curriculum. However, it was also argued that the reality of the situation, for both the tutors and students, was often that these aspects were separated. This separation occurred not only between the theoretical sessions taught in the classrooms at college and the practical activities they engaged in during their workshops there, but also between their work placements and the college context.

In general, both the tutors and students felt that it was those students who were apprentices who were the most advantaged as they had the potential to gain further practical experience if they needed it or some extra direction about how theory and practice linked up in different situations. It was the full-time, unemployed or self-employed students who were felt to really miss out. This was because of the supposed overemphasis placed on theory in the college setting, the lack of material resources to undertake the necessary practical activities, and the inauthentic nature of the practical workshops in college (which were not considered to offer relevant, real-world experience).

The findings in this chapter in relation to the discontinuity experienced between theory and practice in plumbing training would seem to suggest that Jessup's (1991) original NVQ doctrine (as mentioned in earlier sections of the thesis) has been subverted because it was originally conceived in terms of the close integration of practice and theory and integrated assessment and learning. Jessup stated that pursuit of the NVQ model would lead to the learning and

assessment of knowledge in respect of each element where it was relevant to practice. Jessup (1991: 25) asserted that 'simply to assess (and teach) them separately will fail to make the links between theory and practice which are so crucial for competent performance'. Yet this study provides evidence that these aims were often not being achieved for the majority of the trainee plumbers in the sample and that the marriage of theory and practice in the NVQ system still left a lot to be desired.

One of the main issues that students experienced in this respect was that the teaching that they received was organised to suit their respective college's interests (or at least the practical situations that these colleges faced e.g. high student numbers). This is something that Biemans et al (2009) commented on. They argued that it was very important for the 'learning activities performed by individual students in different places at different times to be aligned with each other' (Biemans et al, 2009: 281). These included reflection in school on training tasks performed at work. Biemans et al (2009) described the consequences of such approaches as insufficient connectivity between students' school assignments, workplace training tasks and competence-based assessments, creating a lack of continuity throughout their learning pathways. What Biemans et al's work seemed to suggest was that any discontinuity between these aspects would result in lost opportunities for learning. In the case of the students in this research, it could be argued there has been a lost opportunity for important reflection 'on and in action' (Schön 1987: xi) and to recognise when theory was being applied in practice. Here, reflection 'on and in action' may be understood as learning by doing or "the thinking what they are doing while they are doing it" which is compromised when theory and practice in the curriculum are separated (Schön 1987: xi).

Bruner's work might also add to our analyses of these students' educational experiences. Indeed, Bruner (1960: 12) asserted that if prior learning was going to make later learning easier, then it had to provide students with a general picture of how subject matter related to each other. This seemed to occur naturally in practical situations at work, where students had the whole job or house in front of them, as compared with an isolated plumbing task located on a small board in the college workshops. However, this was not the intention that

Jessup (1991: 126) had for NVQs when he stated that it was 'is critically important that learners can draw upon and relate the relevant aspects of knowledge when presented with problems and situations in their professional or occupational role'. Jessup (1991: 122) said that knowledge was required 'in the context of practising' an occupation in order to ensure competent performance and to facilitate skills and knowledge transfer.

Of course, Biemans et al (2009) conceded that vocational school learning was very difficult to integrate with learning in the workplace. This was a conclusion echoed by Guile and Okumoto (2007) in their analysis of the UK's Advanced Apprenticeship Programme. However, Biemans et al (2009) stated that Dutch vocational institutions had made considerable efforts to design, develop and implement competence-based learning activities and assessments on job situations in order to make the necessary connections between learning and assessment in school and in the workplace. Similarly, Guile and Okumoto (2007) argued for a more bespoke approach with a greater emphasis on the integration and teaching of theoretical aspects of the curriculum during the course of the workplace activities, which may better suit smaller businesses. These research findings do then suggest some possibility for change within the existing NVQ system, which seems to have diverted from its original aims of bringing together theory and practice. The discontinuity in theory and practice experienced by the trainee plumbers in this setting might not be expected, but the literature shows that it is also not exceptional and that some small aspects of the education system could change to promote more unity between the sessions taught as part of these programmes and to enhance the knowledge, understanding and performance of these students.

The findings in this chapter suggest that, for English plumbing training, the importance of continuity between theory and practice has been played down in favour of more flexible and inclusive vocational training systems and in order to meet wider socio-economic demands. Such flexibilities might mean that plumbing students can learn knowledge and practice at different times and places, but they are unlikely to understand their interplay (at least until they gain further practical experience once they have qualified).

### 5.10.1 Comment on the policy context

Under the 'Learning and Skills Act 2000' (in Rainbird 2006: 24), the Labour government established the Learning and Skills Council (LSC) in 2001, which replaced the previous Training and Enterprise Councils (TECs) and Further Education Funding Council. The LSC had responsibility for the funding of post-sixteen learning (except for universities) and operated in a top-down approach, setting a national framework for the management of resources through local LSCs. However, a consequence of this centralised approach was the lack of state control over employers, and this led to the formation of SSCs in 2002. In order to establish and develop high-quality apprenticeship frameworks and vocational training provision, SSCs were expected to understand their respective sector needs through working with employer representatives, colleges, training providers, unions and universities (Rainbird, 2006; LSC, 2009).

The Labour government were very keen to get employers involved as partners in the development of programmes/curriculums (e.g. with the Diploma qualifications and with apprenticeship frameworks i.e. through SSCs). The development of the 14-19 Diplomas was a reflection of Labour party policy aimed at ensuring that theoretical learning was applied. Haynes, Wade and Lynch (2013) reported that the government provided an abundance of information for schools, colleges and employers in relation to work-related learning (WRL) across the 14-19 curriculum in general (e.g. DCSF, 2007; DCSF, 2008a; DCSF, 2008b; DCSF 2008d; DCSF, 2008e; DCSF, 2009) as well as information specifically aimed at the consortia responsible for the delivery of the new Diplomas (e.g. partnerships between schools, colleges, employers, training providers, local authorities and higher education institutions) (DCSF 2008c).

However, the exploratory pilot that I undertook revealed that Summitskills, the SSC for plumbing, had difficulty engaging employers for qualification consultations. Moreover, there was a general feeling, communicated anecdotally by the plumbing tutors, that the decisions about the organisation and content of plumbing qualifications had already been decided elsewhere. It



appeared to those attending the meetings that SummitSkills had failed to create the impression that wider stakeholders, including educators, small employers and the self-employed, were involved in the design of employer-led qualifications. This situation reflected Coffield's (2004: 293) concern that despite the Strategy Unit producing an action plan in 2002 detailing '31 new initiatives for workforce development, there was still no target for increasing the engagement of employers in training'. It should be noted that the 'vocational' in the title NVQ implied some element of work-related learning, which required most of the evidence for occupational competence to be collected in the workplace (Jessup, 1991). Hence, the lack of employer engagement created significant implications for the credibility of vocational qualifications and the supply of apprenticeships and work-based learning places for those on full-time vocational college courses.

In order to improve this situation, a number of mechanisms (levers and drivers) were deployed by the state to bring about an increase in the provision of WRL. There have been multiple funding streams to support WRL, including: the supply of funding to Education Business Partnership Organisations for 14-16 WRL; the Increased Flexibility Programme; the Key Stage 4 Engagement Programme; funding for practical learning (Direct Schools Grant); the European Social Fund; and funding from Regional Development Agencies (DCSF, 2007 in Haynes, Wade and Lynch, 2013). However, Haynes, Wade and Lynch (2013) suggested that these funding streams have been largely directed at schools, confirming Coffield's (2004) earlier concern about the government's lack of leverage over employers to engage with 14 to 19-year-old education and WRL.

The Labour government's emphasis on work-related learning in their policy documents/initiatives signalled that there appeared to be a tension between the values such documents/initiatives espoused and what was happening in practice. The importance of work experience, which was an advantage to employed apprentices but disadvantaged unemployed, unapprenticed students, was ignored in the organisation and delivery of the plumbing curriculum. The weaknesses of college-based approaches to training, which compounded the disadvantages for full-time students, were identified in the findings of this chapter. The lack of coherence between college and work within the plumbing

curriculum coupled with the findings of the exploratory pilot above support Rainbird's (2006:129) assertion that despite the formation of SSCs, 'there was little support for the development of cooperative relationships at different levels to support curriculum development and innovation'.

The next chapter deals with teaching and learning in both college and work contexts. The chapter also describes approaches to pedagogy and students' motivations and preferences for learning in the different contexts of classroom, workshop and workplace.

## **6 Teaching and learning**

### **6.1 Introduction**

This chapter focuses on the data generated in relation to those research questions that focus on the teaching and learning of plumbing students. The chapter outlines the tutors' views about how their students learnt best, how they responded to their tuition and how they continued their work in their own time. It also includes their views and experiences of teaching these students in terms of their chosen pedagogical strategies and personal/biographical experiences of being a teacher/learner. The chapter also reports on the students' views of these teaching sessions, on their own motivations to learn and on their preferences for teaching and learning. Owing to the split nature of many of the courses (the fact that they took place across both the workplace and college contexts), the chapter is roughly divided into two main sections with the first section focusing on teaching and learning in the college context and the second focusing on this in relation to the work-based placements.

### **6.2 Students' educational backgrounds and preparations for learning plumbing**

In formal interviews, it was common for me to ask tutors about whether they felt that there were any aspects of the course that students particularly struggled with. The common response to this question from tutors from all three of the colleges was that there was an issue relating to recruitment. The tutors felt that what was particularly problematic was that full-time students, adult students and apprentices were being recruited onto plumbing courses without the necessary literacy and numeracy skills to deal with aspects of the plumbing curriculum.

Tutor Matt (C2), for example, said:

*There are no entry criteria for a level 2 course as far as I know. (tutor Matt C2)*

This was something that was echoed by tutor Kim (C2), who said:

*There are no criteria and more often than not, students are sort of Ds, Es and Fs. (tutor Kim C2)*

She explained:

*We tried the 'bpec' guidance of having three Cs but, to be honest, we wouldn't have filled any classes at all. (tutor Kim C2)*

This was felt to present a particular challenge for tutors, especially given the theoretical demands of the college curricula and low levels of academic attainment amongst a high proportion of plumbing students.

It was also the case that many of the tutors reported 'vast' (tutor Mike C1) differences in students' academic abilities within their college groups:

*There is such a vast difference in abilities. (tutor Mike C1)*

*You have got all different levels of academic ability; learning difficulties. (tutor Darrel C3)*

Some tutors believed that schools' careers advisors were inclined to suggest practical subjects like plumbing to their less able students while having no understanding themselves of the theoretical demands of the curriculum. Consequently, it was felt that the younger students in particular were subscribing to plumbing courses expectant of practical curricula and hands-on type learning and were not being adequately prepared for the theoretical weighting of the plumbing curriculum:

*...we are getting vocational students that have been told it's all going to be practical and it's not all practical; there is a lot of theory involved. (tutor Terry C2)*

Most tutors across the three college sites described students on their plumbing courses as more inclined to hands-on or practical learning than being disposed to classroom types of learning:

*...students are always going to want to do the practical; they will have no interest in the theory. (tutor Bill C3)*

*They want to do practical...The majority of our apprentices are definitely kinaesthetic learners. (tutor Terry C2)*

The tutor reports of students' practical dispositions and low academic attainment were concurrent with the way apprentices and adult students in this study sometimes described themselves:

*I had a really big problem with maths when I was at school...I know myself and a couple of the other kiddies in the class struggle big-time with maths...There is not enough time in maths for them to help me. (adult student Gary C3)*

*I hate key skills...I just think it is pointless to be honest. I am dyslexic and I struggle with all the theory side of things (adult student Jason C3)*

*I am not very academic. (adult student Cathy C2)*

Some of the adult students and apprentices explained how they found schooling difficult and stated that they had struggled with maths and English as a consequence. In line with the earlier tutor comments, adult students and apprentices described themselves as more inclined to practical types of learning:

*I would like a bit more of really seeing it rather than just doing slides or learning it from slides, actually really doing it, a bit more practical...I learn more hands-on than being taught. (Steve C1)*

*...practical is better, when you are actually doing stuff, and not watching slide-shows...I prefer to learn hands-on. (Jake C2)*

*I am a very practical person, for me, I would rather have the hands-on experience and then read about it. (adult student Cathy C2)*

Given that many students on plumbing courses described themselves, and were described by tutors, as not disposed to classroom types of learning, the theory-weighted college curriculum seemed to oppose these dispositions.

### **6.3 Student motivation in the college context**

Some tutors felt that, owing to their practical dispositions, some of the students had a tendency to get bored in college lessons and 'mess around' as a result. During the college observations, I witnessed varying levels of disruption across the college sites. Of course, some of this disruptive behaviour may have been as a result of my presence as a researcher and some of it would also seem to have been due to members of staff leaving the classroom (providing greater opportunities for freedom). Tutor Terry (C2) suggested that disruptive students were often directed towards plumbing courses by school career advisors because plumbing was perceived by them as a practical type of occupation:

*I have heard plenty of times 'ideal for vocational studies', which translated on a report means 'mucks about', 'can't control himself in a classroom'. (tutor Terry C2)*

Tutors across the three college sites reported that students were being recruited and enrolled on plumbing courses who were not disposed to the theoretical demands involved with learning plumbing. Owing to the large demand for plumbing courses, tutors had to deal with many students who were unresponsive to classroom learning situations.

In interviews, I also asked the tutors questions about the motivation of their students to learn outside of the classroom (i.e. to do their homework or attend extra events). Tutors across the three sites overwhelmingly stated that the adult

students were much more likely to be motivated to manage their own learning than the younger students, which included apprentices and full-time 16 to 19 year olds:

*...the younger ones, even for the little amount of homework they are set, there is a reluctance. Again, I think that's not just full-timers, that could be apprentices as well. (tutor Den C2)*

*...our adults, they are very keen...The youngsters, you have to push all the way through, there is no drive to them and that's why there is a vast difference between the two. (tutor Mike C1)*

Tutors at C2 commented that they felt that the lack of motivation in younger students to study and engage with classroom learning was a consequence of the assessment method of multiple-choice questions:

*I think especially with a lot of apprentices, I don't think they see it, as they need to put in the effort...the way that it is multiple-choice to get through 12 tests. (tutor Matt C2)*

*The majority of day-release, I would say, do minimal revision and, in one sense, I would blame the assessment. (tutor Terry C2)*

The issue linking the students' motivation with the method of multiple-choice assessment is explored further in the next chapter.

However, there were also other reasons suggested for this misbehaviour. Assessor Luke (C2), for example, claimed:

*The younger ones seem to think that college is still similar to school, where they will come in and they will think, 'I can take it a bit easier'. (assessor Luke C2)*

Further to this, some tutors argued that the students' motivation and prior attainment could partly be due to their family upbringing and social background.

These students were perceived as coming from socially-deprived backgrounds with families on benefits and a lack of experience in the world of work:

*I have worked in colleges in socially deprived areas and, quite often, they can't see the value of what they are doing. (tutor Larry C1)*

There were a significant number of apprentices within the study who had found employment through family contacts. A minority of tutors at C1 described apprentices employed by family firms as sometimes having different levels of enthusiasm and motivation to other apprentices who had been selected through formal interview process. This issue was not communicated as a criticism of family firms, but an observation that families may be more forgiving of their apprentices' lack of engagement in college, which would not be expected of apprentices employed in other ways.

#### **6.4 The importance of age**

Many of the comments made in relation to student motivation were also made in relation to the different age groups. It seemed that the tutors saw significant differences between the older and younger students. Tutor Larry (C1) believed that those younger students who had experienced social deprivation were less likely to value or relate to formal schooling. He said:

*I think the 16 year olds, they haven't got the work ethic'. (tutor Larry C1)*

The majority of tutors across the three sites had difficulty understanding why younger students and apprentices were failing to engage with college activities and with learning in college and in their own time.

In contrast to the tutors' descriptions of younger students' lacking motivation, they perceived the adults as ideal students. It was apparent from the college observations that the adult students shared the same social background to the younger students and the interview data revealed adults were often furnished with similar literacy and numeracy difficulties as their younger student peers. However, the adult students appeared engaged and attentive in comparison to



the younger students. This does of course beg the question as to whether there were other reasons for the young people lacking motivation in college, rather than this simply stemming from their social background and key skills difficulties.

Adult students were described by tutors as having a desire to learn and an interest in the subject matter:

*The older, more mature students, post-19 and upwards are there because they really want to understand the subject and would take the time to read at home. (tutor Den C2)*

Some tutors thought that adult students were more committed because they had existing financial commitments and were paying for the courses themselves with the intention of becoming self-employed:

*I have got private, paying students and they are the ones that are going to bleed the lecturer; they are the ones that want the information, they want the knowledge. (tutor Ron C1)*

*Where adults have mortgages, they are a bit more committed, I suppose, compared to some of our second years. (tutor Kim C2)*

This reasoning can be related to the way some adult students described their routes into plumbing as a second chance and, for some, an opportunity to make up for past regrets. In this sense, adult students seemed much more sure about the purposes of their learning the second time around. The adult students were also much more likely to present themselves as ideal students and this was something that was observable in the college classroom activities. Adult students were considered by their tutors to be motivated, interested, engaged and attentive and, as a result, many tutors responded positively to these student dispositions:

*The only pleasure I get is taking the adult group once a week, that's fantastic. (tutor Alfie C2)*

*I prefer teaching the part-time adults, because they want to learn. (tutor Ron C1)*

In contrast, there was a level of disappointment voiced by some tutors with regard to younger apprentices' attitudes to learning in college contexts, especially in the case of apprentices who had the employment opportunity that many motivated younger students on full-time courses desired:

*Why don't these kids wake up and start realising the opportunities that they have got. They are in jobs, they have good wages, some of them have a great future, but they finally come into college and you find that they are not engaging...It's wearing me out. I am getting to the end of my tether now, to the point where I am thinking, 'should I be here?' just the laziness of the students and stuff. (tutor Alfie C2)*

Tutor Alfie emphasises the lack of motivation in some apprentices despite their perceived level of privilege compared to the younger students on full-time courses who do not have jobs.

When talking to the younger students as part of the research, it became apparent that they sometimes had different motivations for attending college. These motivations differed from those that their tutors expected from them. Many of the students explained how they liked seeing their friends each week and they enjoyed the social aspects of the course. It was apparent from the student comments that the tutors had helped them to feel at ease in the college context and that they had been enabled to develop a sense of belonging. In fact, there were few, if any, students or apprentices who spoke disparagingly about their time in college. They seemed generally happy with their course and the facilities the college provided.

## **6.5 Tutor support and student motivation**

Just as students spoke encouragingly about the college, they also held their tutors in high esteem. There was little criticism of tutors and the general

sentiments reported indicated that students and apprentices were treated well by tutors in college and that this support worked to motivate them. Both adult students and apprentices described particular tutors who had supported them in their learning:

*In college, probably Den, he is pretty good...he gave me some motivation in the first year to find a job. (Oz C2)*

*I was on the verge of giving up quite recently, and they have been fantastic. They have been absolutely fantastic and I can't fault them at all. (adult student Cathy C2)*

Tutors across the three college sites provided pastoral support to many students, helping them with problems that were outside the remit of the course. Students described their tutors as patient, caring and willing to listen. Those students who had sometimes failed in the school sector were inspired to learn without the fear of getting things wrong. Sammy (C3) was appreciative of the way tutors helped him to feel at ease in his learning:

*You can learn, it's easy to learn, but you are not constantly under pressure with someone having a go at you...say if you do an exam and you fail, you haven't got someone shouting in your ear...they don't have a go at you if you have not done as well as everybody else. (Sammy C3)*

From these comments we can see that it seemed that the tutors had created an environment for learning that was safe and enjoyable for students. This was something that was observable in the sessions across all of the college sites. However, some of the younger students seemed to interpret some tutors' caring and occasionally laid-back approach as an opportunity to take things easy. Many of the younger students reported that they perceived college as less challenging and demanding compared to the workplace:

*College is easier really, work is a bit more strict. It's quite laid back at college. (Chez C1)*

*Just have a laugh with the lads every week. (Curtis C1)*

*Just quite easy, I see it as a day off work really. (Oz C2)*

*I am quite happy with college actually. (Sammy C3)*

Students were enjoying their time in college but, in keeping with what tutors had earlier reported, most apprentices and younger students were often reluctant to engage with plumbing learning in their own time and often not disposed to classroom types of learning.

## **6.6 Teaching: A didactic approach to teaching in the plumbing classroom**

As well as asking questions about the students' learning, their motivations and their achievements, I also asked about the tutors' perceptions of their teaching (including strategies used, styles adopted and any difficulties and limitations that were experienced). The plumbing curriculum was reported as being organised into modules, which were weighted towards theory (the next chapter reports on this in some detail). The tutors felt that these modules were useful because they brought some structure to the running of the course, which in turn created some direction for students. However, as each module had its own test, many tutors reported having little time in lectures to do anything other than deliver the module, which they felt impacted on their teaching style:

*...with the time constraints that we have got in trying to deliver the scheme...I think it's instructional what we do. (tutor Larry C1)*

*More of a teller, I tell the students...it is the way society has dictated how we should teach. (tutor Ron C1)*

Many tutors were aware that there was a lot of information to deliver to students who were often reluctant to engage with learning in the classroom. Around half of the tutors across the three sites reported that students expected to be 'spoon-fed':

*We have come to a culture where they expect everything to be thrown at them. They are expecting all the answers. They are expecting us to do it for them. (tutor Ron C1)*

*There is an element of expectation, especially with the older students; they want the conventional ways because it was the way they were taught at school. (tutor Matt C2)*

In contrast to what the tutors said about spoon-feeding and the appreciation of transmission-type teaching, the students often reported not being particularly responsive to this style. Both younger and adult students reported preferences for practical and work learning. The subsequent lack of ownership with regard to subject knowledge learning (which was more theory-based) on the part of the younger students and apprentices caused frustration amongst some tutors, who felt they were working hard to help students learn:

*Where do we stop 'baby-feeding' people and where does the student take ownership and say, 'Yes, I want this qualification and I am going to work for this'. (tutor Mike C1)*

In describing their taught theory lessons, the majority of students emphasised the purpose of the theory sessions as related to the test rather than to what they were doing in the practical sessions in college or at work. C1 apprentice Chez's description of the mode of delivery indicated the prescriptive nature of the curriculum. This, in turn, seemed to influence how teaching and learning was organised for a typical lessons at NVQ2 level:

*It's in chapters, so we learn what we need to learn in lectures...Tutor does a little slide show or gets us to watch a little video, fill out the handouts from the questions in the book and we will do some past papers if we have an exam coming up. (Chez C1)*

The plumbing books purchased by students were designed specifically for the course, along with the teacher-packs, which allowed courses to be delivered in

a standardised format. However, a number of apprentices reported difficulty in responding to formal lectures in the classroom context:

*I find it hard when they have just got the slide show on the board. What are they talking about? I find it hard to take it all in. I don't learn very much like that. (Connor C2)*

*...sometimes they get a bit boring when there is just the same old thing of slides and PowerPoint, it gets a bit repetitive and boring. (John C3)*

The mode of delivery of the curriculum failed to inspire the majority of apprentices and a small number of students were aware of the limitations of book learning and transmission-type lectures:

*...reading books and listening to somebody talking, it gets boring, isn't it twenty minutes or something? (adult student Jess C2)*

The majority of younger students, apprentices and even some adult students showed signs of boredom when experiencing a three-hour theory session, which was taught mainly through transmission of information presented in a PowerPoint presentation. The larger proportion of adult students and younger students across the three sites reported that they found it difficult to learn from this didactic type of teaching approach.

However, it was apparent that tutors were cautious of allowing younger students the freedom to be self-directed in their learning in college contexts:

*I will try to make it more humanistic, but if I let them have too much, I will lose them. (tutor Ron C1)*

*Oh yes, the humanistic approach and all that rubbish, you can't let them go in a plumbing department because it would just all fall to bits. The majority of our apprentices need to be controlled and pushed in certain ways. (tutor Terry C2)*

The tutors often considered learner-centred approaches as unsuitable for the majority of their students, whom they perceived as expecting to be taught. The majority of younger students in the study were described as generally lacking the motivation or disposition to take ownership of learning in a self-directed way. The majority of tutors thought that the apprentices and younger students needed to be controlled, and there were some tutors who thought that a more authoritative or disciplined approach was necessary. Tutor Ron C1 said:

*I think, for a start, tutors need more authority of the class and the students. (tutor Ron C1)*

Tutors generally commanded a disciplined approach in the plumbing workshop because there were hazards, and tutors had a responsibility to reduce risk and ensure safe working conditions. The majority of students on plumbing courses had no work experience and many students had never handled power tools, operated machinery, used welding equipment or worked with flammable gases. Tutors teaching practical sessions had significant risks to consider:

*I see myself as sergeant major in the workshop...I've got pretty good control over most of my groups...I think the problem is right at the beginning, they come through school and they come here with no respect. (tutor Alfie C2)*

At college C1, a tutor referred to the college as 'boot camp', which implied that college was a correctional facility. One tutor said that teaching has to be planned with military precision and the teaching strategies proposed on the teacher training programmes just did not fit (cobs C1, 30/09/2009).

## **6.7 Alternative teaching styles and strategies**

Although tutors were critical of teaching theories, many across the three college sites were using them either intentionally or unintentionally to help students learn. In teaching groups of students with varying abilities, interests and

motivation, one tutor suggested, for example, that progression for more able students was being obstructed by slower learners in the group:

*I have learners, what I call the 'top end' of learners, who have a thirst for knowledge and who want to be the best in their field. We are not geared up for that, we are geared up for the slowest learners that are at the bottom of the group. (tutor Mike C1)*

Tutor Mike (C1) said that he dealt with this situation by giving students different projects to challenge the more able students while bringing along those who struggled. Tutor Terry (C2) gave out handouts in the lessons so that students could work at their own pace:

*...they all work at different speeds...which is one thing with giving them a handout, they can work at their own pace. (tutor Terry C2)*

At college C2, there was an ethos of helping students of differing abilities participate in the same qualification projects with the aim of developing their literacy and numeracy skills. At C2, there was a subject-specific learning support assistant to help where required, and students' key skills needs were identified by plumbing tutors early in the course so they could offer this assistance. Tutor Den (C2) had a didactic stance, but he tried to introduce activities to help students participate in both peer and independent learning in classroom sessions at level 3. His approach allowed the more able students to be challenged while he guided the less able students through the same project. Where students struggled, he encouraged them to interact with peers. However, as noise levels in the classroom went up, he often had to intervene and encourage students to work independently.

Tutor Den (C2) had even developed his own assignment for the level 3 apprentices, which related to differing aspects of the college curriculum and encompassed the design, plans and plumbing specifications for a new-build house. The students were observed working on the project over several weeks in the classroom. The project covered a range of different modules including cold water, hot water, heating, gas installation, pipe-sizing and material



specifications, which were integrated within the project (cobs C2, 12/11/2009). The project brought some holistic sense to the students' otherwise fragmented curriculum because they could relate to a whole house plan and see where the various plumbing systems and components were located:

*Throughout the level 3, they are given little projects to do, little assignments, so they do get used to writing specifications and doing design work and calculations, that sort of thing. But that is something we have created, rather than being part of the curriculum. (tutor Den C2)*

I observed tutor Den (C2) teaching at NVQ3 level and his lessons covered some of the most complex areas of plumbing, such as pipe-sizing calculations and understanding the science of pressure and flow. His subject knowledge appeared secure and he was able to facilitate learning effectively through his ongoing interactions with the students. Tutor Den used a style of gradually leading his pupils into complex charts and tables and getting them to calculate pressures and flows for sections of pipe work within the project for themselves. He demonstrated examples of the calculations for students and they had these as reference materials while they worked through other tasks. Following the activity, apprentice Jake (C2) was able to informally explain to me the calculations that he had learned and used in the project. The larger proportion of students observed, which included the adults, remained on task, but there was still a lack of interest shown by around half the apprentices in the group who needed to be regularly prompted by the tutor (cobs C2, 03/12/2009).

In order to help students engage and participate in learning, some tutors used teaching techniques within the constraints of a teacher-led approach:

*If you come to college, you want it to be fun and the odd lesson to do something different, I think this is valuable rather than just trudge through the syllabus and turn out the other end...I've done them crosswords, projects, assignments. (tutor Terry C2)*

Other tutors described how competition and games helped to encourage participation and engagement of students in the theory sessions:

*If you say, 'Right, we are going to split you up, we're going to have a little competition, you're going against them', then straight away they're all fired-up, engaged, and they want to do their best. So, competition is a very, very good way of increasing motivation. (assessor Luke C2)*

In concurrence with tutor comments, a minority of apprentices and adult students told of their approval of competitions used in teaching sessions:

*The teacher also plays learning games with us and this is a good way of learning. Competition is good for learning because we want to beat the other team. (Steve C1)*

I observed that both students and tutors generally enjoyed competition as a way of helping students participate in aspects of college learning. The observations revealed that some tutors used competition in the workshops (e.g. time trials for students to assemble a valve or tap), recording which student was the fastest plumber. The activity got the attention of the whole group and students were able to assemble and disassemble tap components and compare the various parts to handouts the tutor had given them to label. Students learned about the components they were handling instead of merely looking at pictures of them on a PowerPoint presentation. Students at C3 seemed to enjoy the experience and it was observable that the process was far more engaging for them than the classroom theory sessions I had observed (cobs C3, 04/05/2010).

At a national level, there was also status to be earned for tutors and the college through entry to national plumbing competitions:

*We put our students in for competitions regionally and nationally and obviously that was excellent when we got top for copper and for sheet lead at the national UK final. (tutor Matt C2)*

Winning a national final for skills is no simple feat and tutor Matt's (C2) appraisal of his students' success was reflective of the ethos of the college,

which aimed to play a large part in the motivation and well-being of students, who in turn responded to the competitive nature of the pedagogy.

Although the data suggest that the ethos of the college site at C2 was associated with high standards, tutors were able to reflect on their practice and identify weaknesses. Tutor Den (C2) suggested (above) that there needed to be more coordination of theory and practice and many other tutors across the three college sites described the linking of theory and practice as the change they would like to see. Tutor Alfie's (C2) teaching practice presented such an example in terms of the coordinated teaching characteristics described by tutors for linking theory and practice. However, according to tutor Alfie's (C2) colleagues, he had the advantage of doing nearly all his teaching in the workshop. Therefore, it was mostly the case that he had not taught the students their subject knowledge in the classroom. Tutor Alfie (C2) voiced his reservations (above) about classroom-type teaching and his need to repeat aspects of plumbing subject knowledge to students. He tried to create a realistic learning environment in his workshop by treating the students as apprentices. He helped them learn interactively and in an integrated way, where theory and practice played out in the same context creating relevance and giving purpose to the learning. He appeared to achieve this with great success in his teaching style, which continually related aspects of subject knowledge to performance activities. The following ethnographic snapshot describes his approach:

*Unlike the other colleges in the study, there was an interactive whiteboard installed in the workshop space. This allowed the tutor to present chunks of a lecture in the workshop environment. These mini-lectures were followed by student activities that corresponded with the subject knowledge taught in the same context. Alfie (C2) gave a lecture on gas pipe-sizing and followed this up with relevant hands-on tasks for the students to undertake in the workshop context, which were purposeful and meaningful for the students (cobs C2, 12/11/2009).*

Tutor Alfie (C2) had gone to considerable effort and time to develop cutaway teaching resources and cutaway sections of older technologies in the form of dissected boilers and electrical components. The tutor demonstrated both

practical and technical competencies with great care, which appeared to motivate the majority of students and engage their attention in participation.

## **6.8 Tutors' prior experience and its impact on teaching**

Tutors' prior work experience furnished their biographies, which seemed to be an important characteristic of their teaching practice. Tutors described the value of practical experience in the workplace as fundamental to the teaching of plumbing:

*We have all been on the tools, we have all done it and that is what they learn from us. (tutor Norman C3)*

*I think it's good because I've been out there. I can bring real life instances into it and reflect on my practice, which I think is good for learners. (assessor Luke C2)*

Just as tutors, apprentices and students earlier described work experience as necessary for making sense of college theory, teachers also valued their own work experience as essential to their teaching. Tutors were aware that many of their students were full-time and had no work experience to draw on, so tutors used interesting anecdotes and stories to help them relate to plumbing topics:

*My style is to chat and to talk through things...I always put experiences in just so that the apprentices can relate to it or so the full-time students will be able to relate to it. (tutor Darrel C3)*

*I really feel that when you are trying to impart knowledge to people that are relatively new to industry, then I think that experience and background knowledge plays a major part. (tutor Den C2)*

Tutors generally understood that students responded positively to teachers they respected as practitioners, that is those who had 'been on the tools' (tutor Norman C3):

*I was very lucky on the range of experiences that I had throughout my apprenticeship and the work that I did after...I've seen it, worked with it and done it...If I walk into that workshop and they say, 'Well you pull a bend or you do this', I can pick it up and do it, not a problem, and explain it and go through it. (tutor Matt C2)*

It was important for tutors to demonstrate the skills they had in a practical way. Tutors suggested that students were inclined to be inspired or show some respect to those tutors who could perform practically in the job. In addition, tutors suggested that their experience allowed them to talk about the theory relating to the job in a meaningful way. Some tutors performed motivational roles, which they used to inspire their students by showing enthusiasm for their occupation of plumbing. Many tutors wanted students to share their interest:

*Ultimately, I try to breed success into students...me being at the front of the room and maintaining my motivation and excitement of the course tends to breed that into the students. (tutor Bill C3)*

Some of the tutors even expressed some sympathy and recognition for the experiences of their own students by commenting on the similarities between both sets of experiences:

*Going from how I was, I was just one of those students that, when I was their age, I couldn't wait to get out of school. (tutor Alfie C2)*

*I didn't honestly learn a great deal at college. If I am frightfully honest, I seen college as a day off and I think mentally, most people think that when they come to college...But when I was 18, all I wanted was to get out of there. (tutor Darrel C3)*

These tutors often showed pastoral care in empathising with students' lack of motivation in college in order to try to make it interesting. All of the tutors made efforts to make learning inspiring for students in order to improve their levels of motivation.

Students did generally respect their tutors for their depth of knowledge and experience in the plumbing industry, which helped them relate to what was being taught:

*Some of them can bring across the theory and kind of bring it to life and they can use their own personal experiences to make you understand things that you may not necessarily understand just by reading it in a book. (adult student Cathy C2)*

*...all the lecturers have been out there plumbing. I think this is the difference; they have been on the job and they know what it is about, so they are not just giving the theory of it. (adult student Jess C2)*

These students admired their tutors' ability to explain things clearly and in a practical way. Despite the lack of motivation in some students, they were all willing to recommend the plumbing course to others. The students generally liked their tutors and some formed strong bonds with them, especially when groups were small or when tutors had opportunities to spend more time on a one-to-one basis with students:

*...he taught me a lot and I learned loads last year and really enjoyed it...He was sort of more one-to-one, I felt as though I had a strong bond with him. (Connor C2)*

*...it's been good with Larry, because it's a small group and we get to know everyone. (Chez C1)*

Despite tutors having to deal with the disruptive behaviour of some students, along with other contextual issues at each of the college sites, they cared for students and wanted them to succeed. The teaching approaches observed in this study had a mainly didactic approach because tutors were subject to delivering a modular curriculum. However, the college ethos, particularly at C2 and C3, in terms of pastoral care seemed to make a difference in terms of students' learning. In addition, C2 embraced technology and quality

management to develop their provision beyond the prescribed curriculum and to improve students' learning through national competitions.

Moving on from discussing teaching and learning in the college context, the next few sections turn to the data that focus on this in relation to the work context.

## **6.9 Apprentices' motivation at work**

Whilst students and apprentices sometimes seemed to be disengaged in college, they displayed motivation to get the job done when performing in the work context. Of the five candidates observed at work, Curtis (C1), Jake (C2) and Brent (C2) showed a significant difference in their attitude and behaviour compared to that which I observed in college. For the other two candidates, John (C3) and Jason (C3), there was less of a difference. Jason was an adult student and, like those described earlier in the study, appeared motivated in both the college and the workplace settings. John was an enthusiastic 16-year-old apprentice, at an early stage in his apprenticeship, and there was no observable difference in his attitude and behaviour between college and work. John was in a minority of apprentices who engaged with some learning in his own time and seemed to be interested in the technical aspects of plumbing taught in college.

The fieldwork observations in college described Curtis (C1) and some of his peers as reluctant students whom tutors had to motivate because the college course seemed to lack purpose for them. The following extracts from the college observations exemplify this. They describe the events with Curtis (C1) at the start of the college workshop sessions over three consecutive weeks of the day-release course observed:

*Tutor Larry and I arrive at the workshop just before 09:00 hours and the students are wandering in with little sense of urgency or motivation. Larry tells them to get their overalls on, so they leave the workshop to get them (cobs C1, 07/10/2009).*

*There seems to be no sense of urgency about Chez or Curtis. Chez has overalls tied around his waist. Curtis has no overalls on at all but chooses to wear an old shirt and trousers. They are both wearing safety boots (cobs C1, 14/10/2009).*

*Curtis is sat on the bench and he is early today, but he is not for starting work, he is just waiting around (cobs C1, 21/10/2009).*

The events supporting my understanding of apprentices' differing attitudes at work became apparent early in the fieldwork. I had arranged to collect Curtis from his home and drive with him to work but, unlike his attendance in college, he was punctual for his job. Curtis had an important job for an 18-year-old, including responsibilities that extended to escorting me on the site at all times for reasons of safety and security. Unlike his demeanour shown in college, Curtis spoke with clarity and confidence and he had a sense of purpose and belonging at work that I did not observe in college:

*We arrive at the plumbing office on the first day and a job list was waiting for Curtis. He had problems to find, diagnose and fix. On completion, he calls the help desk to report and find out where he was to go next. He is given a few more jobs, including a leaking radiator, a toilet that won't flush and a noisy cistern (wobs Curtis, 09/02/2010).*

In contrast to Curtis's behaviour in college, it was evident that he had accepted the socialising nature of work and he identified with its artefacts. This became evident by the way he dressed at work. He wore a blue collar uniform and an identity badge at work but, in college, he was reluctant to wear his overalls for the workshop. At work, Curtis had his own workstation in a shared office and he was part of a plumbing and heating maintenance team. He also had other responsibilities such as inspecting industrial boiler rooms for leaks and reporting outcomes. I observed him interact with managers, foremen, customers, workers and assessors with some confidence, which contrasted with the subdued way in which he communicated with his tutor in college.



In the workplace, apprentices were under pressure to complete jobs efficiently and effectively, which was a reason for college learning not being perceived as a realistic learning environment. The type of pressure apprentices experienced at work was described by Curtis's co-worker, who stated that boiler breakdowns could impact on several buildings and they could be without heating and hot water for days (wobs Curtis, 09/02/2010). At work, Curtis was allocated some jobs that may be perceived as undesirable, but he was motivated to get the job done competently and efficiently:

*Curtis makes a start to de-commission the old toilet and it shows that he is keen to do a good job. His hands are gloved as he isolates the water supply. Kneeling in front of the soil splattered toilet pan, he sets about removing the brass pan screws, which had turned green through contact with urine over the years. None of this bothers the apprentice as he struggles to remove the pan screws (wobs Curtis, 17/02/2010).*

While watching Curtis work, it was apparent that he responded to the challenge of work and to those he worked with, which was significantly different from the dispositions he exhibited in his college performance where he seemed bored and not really interested (wobs Curtis, 17/02/2010; cobs Curtis, 21/10/2009).

In the case of Jake (C2), he was working with his foreman, Kenny, in the commercial sector and was supervised in his work at all times. He was observed assisting in the installation of a shower room facility. His activities included fitting copper pipework, plastic sanitary pipework, a toilet, basin and taps. He was also observed fitting radiators, which were connected by pipework to a central heating boiler. Jake seemed bored in college but, at work, he responded to challenges with motivation and enthusiasm. It was apparent that he had a will to work to his foreman's satisfaction. Kenny stated that, nowadays, apprentices were expected to perform more productively early on in their careers. This concerned Kenny, who commented that perhaps too much was expected of young apprentices. Employers and work teams relied on apprentices being productive in order to meet work deadlines and that required them to be motivated to work (wobs Jake, 02/03/2010).

In the case of Brent (C2), he attended several jobs per day doing general plumbing work. Such was his motivation to get the job done, I often observed him working through break times and lunch. In contrast, he did not seem to be enthused or challenged by the college activities in quite the same way (wobs Brent, 09/03/2009).

### **6.10 Students' experiences of teaching and learning in the workplace**

When reflecting on their own apprenticeships, some tutors disclosed the fact that they had learned extensively in the work context through asking questions and working alongside more experienced work peers, whom they sometimes referred to as mentors:

*...when you were in the workplace, there were mentors around you. If you had a problem with something, you could go to a guy and they would tell you what the answer was or give guidance. (tutor Terry C2)*

As an apprentice, tutor Terry (C2) had worked alongside twenty other fitters and he valued their experience, which reflected the way many of the other tutors spoke about their co-workers. He referred to those who taught him at work as mentors because they were responsive in sharing knowledge and willing to support his learning both emotionally, socially and technically. The tutors' accounts of learning in the workplace resonated strongly with their students' experiences.

The students and apprentices in my sample enjoyed being in the workplace and spoke positively about the people they worked with. Apprentice Oz said, 'I like working for the company I work for', which reflected many of the responses given by apprentices and students in the study. Apprentices and adult students were capable of identifying the skills, knowledge and experience of those plumbers that they worked alongside:

*...he has been working self-employed for about 30 years now...he is quite bright, I would say. He was an electrical engineer before he went into plumbing. (adult student Jess C2)*

*Gaz, who I work with, is so good at teaching, I would normally ask him. He has good knowledge and experience and he normally explains it to me...I owe him so much, he is such a good teacher, he has taught me loads. I get on pretty well with him, so I see him as a friend as well, like. I get on really well with him. (Oz C2)*

*Jim, who is like my site supervisor, he is quite knowledgeable, he's got quite a bit of experience. I just ask him and he can always solve the problems. (adult student Jason C3)*

Both the apprentices and adult students wanted to be skilled and knowledgeable like their co-workers and, in some cases, they perceived them as friends. The apprentices reported that they asked questions of their co-workers, who sometimes responded by teaching and explaining aspects of the job, which helped apprentices learn and understand more about plumbing.

Brent (C2) was in the third year of his apprenticeship and in the first year of his NVQ3. I accompanied Brent in the workplace and observed him working on domestic plumbing repairs unsupervised. When he was challenged with problems at work, he sometimes used his mobile telephone to contact his employer or co-workers in order to ask questions and seek possible solutions. Brent explained:

*Geoff says that, most importantly, if anyone hits a problem and they are having real difficulty, help is only a telephone call away and at least one of the team will know (wobs Brent, 23/03/2010).*

Brent spoke with appreciation about his co-workers, who had guided him through the terrain of his apprenticeship. He commented that they were responsive and nearly always on hand if he needed them. Having experienced workers to call on supported Brent in taking risks to further his learning. For jobs that required investigation, such as finding leaks, there were often risks involved with dismantling components that may break or removing parts of the building fabric that may cause excessive damage. Therefore, having people on hand to

consult helped to give the apprentice support in the risks he took in the job, which were then managed. In addition, Brent, who was in his third year, told of the way he had been trained by a couple of colleagues he regarded with some appreciation:

*Brent had spent a lot of time with Geoff and another plumber called Frank and he said that he learned a lot in the process (wobs Brent, 16/03/2010).*

However, in college, apprentices did not often respond to their tutors in the same way as they did to the plumbers at work. In the college context, the tutors were being teachers in a didactic way, which sometimes evoked a lack of response in the majority of the younger apprentices.

The apprentices' learning at work was nearly always supported by the workers around them, who explained and demonstrated work processes and then observed the apprentices' performance to assess that it was up to a competent standard.

*I have a load of plumbers around me, I work with four of them...they show me what to do and how to do it. (Curtis C1)*

At Curtis's college, tutors reported that they were sometimes challenged in terms of consistently providing one-to-one tuition in the college workshop because of the prevalence of large groups of students. However, this was clearly not the case at work, where apprentices received one-to-one tuition on a regular basis. Apprentices shared relationships of trust with their co-workers and there was evidence that this helped to shape attitudes toward difficult jobs. In the case of Curtis, it was observable in the college context that he disliked leadwork and this became more apparent when I asked what he would change about the plumbing course if he was given the opportunity. He replied emphatically that he would get rid of lead. Curtis's lack of response to learning leadwork in college was associated with his perception that it was a skill that lacked currency and relevance to his normal work duties — leadwork had little

purpose for him. However, he described how he was inspired to learn lead welding in his own time, when assisted by his co-worker:

*I went over to his house the other day to do lead welding...I did it, and he said, 'Pretty good'... it was miles easier...Did what I want, when I wanted to do it. (Curtis C1)*

Curtis had made it clear in the interview that he did not do much learning in his own time, outside of college hours. However, he had formed a relationship of trust with his work mentor and seemed to find it easier to learn away from the context of college. Curtis's experience implied that learning with those at work seemed to offer a level of responsibility and sense of purpose that college did not and he responded positively to this. In contrast, when Curtis was given freedom to work and learn in college, he and some of his teenage peers were unresponsive and unproductive (cobs Curtis, 21/10/2009). As a consequence of his mentor's intervention, Curtis was able to describe his leadwork skills as 'pretty good'. He suggested having a choice in doing what he wanted, but he seemed to be doing lead welding and being a plumber in a similar way to his mentor at work.

In the case of John, he was a 16-year-old apprentice and in the early days of his employment with a one-man-band plumbing firm. I observed his employer instructing and sketching diagrams at work in order to explain the plumbing system they were working on. The employer had the intention of imparting subject knowledge to John in terms of explaining the overall purpose of the activities the apprentice was expected to understand. At this early stage, John's tasks were relatively simple. They included assembling the bath and its components, which entailed fitting the supporting legs and installing the taps and waste fittings. However, John understood the importance of his minor activities in their contribution to the overall aims of the job. Meanwhile, his employer was engaged in more demanding activities of running the bath waste sanitary pipework outside the building. The apprentice and employer were working together on the same project, so help was close at hand if the apprentice needed assistance. In this instance, the work of the young

apprentice was closely monitored and guided by his employer (wobs John, 16/07/2010).

Apprentice Jake (C2) was placed with Kenny, an experienced foreman, who had been a fitter in the commercial plumbing sector for over thirty years. Like the apprentices described earlier, Jake also had a desire to emulate the attitudes and workmanship of his foreman:

*The copper pipes connected to the boiler are spaced equally and are adequately clipped. There are no signs of excess solder on the copper connections and the residual flux used for jointing has been removed to leave the pipe work shiny and clean. The apprentice's workmanship reflected the quality of his foreman's work. I asked if all the plumbers on the firm were as conscientious in their work and Jake replied diplomatically, 'Not all of them'. (wobs Jake, 02/03/2010)*

Jake understood the meaning of quality work and responded to those who participated in its production. He had experienced other workers, both at his previous firm and in his current employment, who were not as fastidious as his mentor, Kenny. Jake had chosen to identify with the characteristics of Kenny's practice in performing like his foreman at work. In so doing, he assumed some of the characteristics of his foreman's identity in terms of the values he exhibited. These values underpinned Jake's attitude to be safe, motivated, responsible and self-critical about his own performance at work.

Apprentices and students professed a desire to emulate their co-workers, who were sometimes described as working to high standards. During the college observations, I observed apprentice Ricky (C1) taking great care over the leadwork details that he was fabricating in a college workshop (cobs C1, 07/10/2009). In addition, the informal interview provided an opportunity to ask him why he took such care over his work and he replied that his boss worked to high standards and he wished to do the same (Ricky C1). The field observations at work provided opportunities to observe the interactions between apprentices and workers as they went about their skilled work.

The apprentices and the adult students interacted with co-workers, whom they sometimes emulated in terms of their behaviour and work performances. Apprentices were able to observe the ethics and values inherent in quality workmanship and they often responded to their mentors with trust and friendship.

### **6.11 Barriers to apprentices' learning with co-workers**

Not all of the situations and encounters that apprentices' experienced with co-workers could be described as supportive to their learning, however. Some workers were reported as less inclined to share knowledge with apprentices or support apprentices' progression and learning at work. In reflecting on his own apprenticeship experience, tutor Darrel (C3) described how one of his co-workers helped him progress his learning in the workplace while another of his other co-workers had narrowly productive aims for him:

*I worked with a couple of guys when I was doing my apprenticeship and I preferred to be with one more than the other because he would spend time with me. The other one knew what I was good at and he just let me do it...whereas the other guy would work with me and would help me develop other things. (tutor Darrel C3)*

Tutor Darrel preferred to work alongside the co-worker who helped him to develop new knowledge and progress his learning. On the other hand, his other co-worker was more focused on production than on teaching apprentices and advancing their learning. This worker knew what the apprentice was good at and assigned him where he was most productive rather than where the apprentice was likely to progress his knowledge and skills. Therefore, as an apprentice, tutor Darrel had experienced differing levels of knowledge exchange between the plumbers he had worked alongside.

Apprentice Jake's foreman, Kenny, argued that placing apprentices with workers employed for sustained periods would lead to better learning outcomes than placing them with self-employed workers on a piece rate, who may not have time to train (wobs Jake, 03/03/2010). Kenny's opinion was supported by

Curtis's experience of being placed with a subcontractor to widen his range of skills to meet the requirements of the NVQ2 criteria. In Curtis's case, he was well supported in his regular work context, but he needed more diverse evidence of installing toilets, basins and baths in order to meet his NVQ2 practical assessment criteria. However, his regular employer could not provide him with that type of work opportunity because his regular work assignments were mainly concerned with maintenance. Consequently, the employer acted in the apprentice's interest by arranging for him to gain the necessary installation experience with a subcontract company for a temporary period of time. However, Curtis stated that, during his eight-month secondment to the subcontractors, he felt that he had been employed more as a labourer than as an apprentice, implying he had been taught little (wobs Curtis, 10/02/2010). This temporary arrangement contrasted with the positive experience Curtis had been having in his regular employment, where he was observed as enjoying a relationship of knowledge-sharing and learning with the plumbers he worked alongside (wobs Curtis, 16/02/2010).

In adult student Jason's case, he worked for a property developer and his work mainly involved the conversion of large houses into individual flats. He was responsible for all the plumbing, heating and sanitary work and was sometimes expected to do unskilled work when asked by his employer:

*I work independently. I do first-fixing, second-fixing, soil stacks and, when I am not plumbing, I do a bit of labouring and help load blocks up and stuff like that. (adult student Jason C3)*

Apprentices and the adult student observed at work seemed eager to please their employers by being willing and motivated to engage with the jobs they were assigned, which covered a diverse range of skills, knowledge and responsibilities that were sometimes outside the scope of their craft area. If work required apprentices to do some labouring, then they were expected to respond, which was the case for both adult student Jason and Curtis. Unlike the other apprentices observed in the study, Jason was not employed by a plumbing company, but was supervised at work by an experienced builder called Jim. Jason described himself as working independently because there



was no site-based plumber for him to consult. However, Jim considered it normal for apprentices to sometimes work unsupervised and Jason agreed, giving an example of his early experience in the plumbing trade with his previous company. Jason had been left on a job with 20 houses to plumb in when he had only been at the college for three months (wobs Jason, 19/05/2010).

The close relationships between apprentices and their more experienced work peers were important characteristics of apprenticeship learning, as reported by both apprentices and tutors. However, some tutors and workers cautioned that it was not always the case that apprentices and students were consistently taught, trained and supervised at work by their co-workers.

### **6.12 Learning by problem-solving**

At work, apprentices were continually presented with problems, which contrasted with their curriculum experiences in college. Curtis, for example, did routine plumbing maintenance jobs. I accompanied him on these in order to observe. The workplace setting presented Curtis with unexpected challenges, which required him to deliberate and deploy problem-solving skills:

*We arrive at the toilet to be fixed and Curtis sets about his task to replace a faulty siphon unit, which is the flush mechanism. There is an isolation valve for the water adjacent to the toilet pan, so Curtis turns it off. He then flushes the toilet to empty the cistern, but he is surprised to find that the isolation valve has not stopped the water from filling the cistern because this too was faulty. (wobs Curtis, 09/02/2010)*

Work presented challenges because there were unexpected events, such as those experienced by Curtis in the process of his day-to-day jobbing. The apprentice had to deliberate a solution to the unexpected problem in contrast to his experience in college, which often involved standardised, predictable tasks. Moreover, in college, the solutions to tasks could be copied from other students working on the same assignment or activity. At college, tasks were known and,

consequently, training activities failed to present opportunities for authentic problem-solving, which were abundant at work.

At work, Brent was deployed to replace an existing low-level toilet suite with a modern close-coupled pan and cistern. The observations illustrate how he anticipated and addressed the challenges of a plumbing installation:

*Brent is engaged and is deliberating the problem of the drain outlet positioned in the floor. He suggests a question mark-type pan connector, which allows the pan to sit back further toward the wall, compensating for the design difference of the new suite. Brent is then faced with the problem of the cold feed to the cistern, which he pipes up on the surface, but I can see he is not happy with the job. He goes to the van to get some plastic pipe, which he conceals in the hollow partition adjacent to the WC to make a neat installation. The cold feed now runs out of the wall at low level and connects to the pan inconspicuously.*

*He works quickly and efficiently but, in checking his work, he finds a small leak, which means he has to dismantle the cistern in order to rectify. This is not an easy job, made more difficult by the poor quality materials that the customer had supplied. Brent is aware of the time and it's obvious that he feels the job should have been completed quicker. He says, 'The boss will be on the phone soon, asking where I am'. The apprentice shows attention to detail in filling holes and making the installation tidy. Just as we think the job is complete, Brent seems to think the float valve in the new cistern is faulty and may cause a call-back if not attended to. He replaces it and finally checks the installation completely again before we leave. (wobs Brent, 16/03/2010)*

It was apparent that Brent coped with a difficult installation and demonstrated his competence and knowledge by installing and checking his work thoroughly. The workplace consistently provided problems for apprentices to overcome and solve and they were often required to draw on their experience and sometimes seek help from others. Apprentices were embroiled in meaningful and

purposeful activities, which often required deliberation and competent performance in meeting quality standards and customer expectations.

### **6.13 Learning from mistakes**

It was also evident from my observations that many of the apprentices learned a lot from their work experience through the mistakes that they made. John was 16 years old and had been plumbing for a few months, after leaving school and finding employment with his neighbour who was a plumber. He described how doing practical tasks and making mistakes had helped him to learn particular skills:

*...you can get more hands on and when you get the mistake, you can learn from it. Whereas, in the classroom, you just read the book and you think you have learned it, but probably haven't. (John C3)*

Apprentices were sometimes left to think for themselves whilst being monitored by their co-workers or employers. They had hands-on opportunities at work, which allowed them to experiment with their learning and sometimes the resulting outcome was a mistake. If the process and product of work was not up to standard, apprentices were corrected and consistently given verbal feedback from those they worked alongside:

*If I am doing something wrong, they come over and tell me what to do. (Curtis C1)*

However, mistakes were not always acknowledged by the workers themselves so, for commercial contexts and public sector contracts, there were formalised quality controls. Jake and his foreman, Kenny, both believed that they worked to high standards and this was continually assessed at work by clerks of works and other parties involved with quality control (wobs Jake, 02/03/2010).

During the exploratory pilot study, I accompanied commercial plumbing apprentices who were making corrections to existing work (snagging), which had been inspected by clerks of work and classified as 'not to standard'.

Serendipitously, correcting mistakes provided knowledge opportunities for apprentices, who learned regulatory specifications and dimensions for pipe installations while they went about making the corrections. In the commercial plumbing sector, plumbing apprentices were judged by workers who were themselves under scrutiny from external agents. On the other hand, the domestic sector plumbers were sometimes deemed as competent through the licence to practice-type schemes whereby they self-certified their plumbing, heating, electrical and gas work. Therefore, domestic installers, whether competent or not, did not often have their work regularly inspected by strict external agents. Consequently, it appeared that the domestic plumbing apprentices did not have the same 'feedback loops' when they made mistakes as the commercial plumbers observed in this study.

However, in both the domestic and commercial plumbing sectors, customers paid for the services being provided and apprentices were observed as performing to standards that corresponded with the expectations of their clients. The council tenants whom Brent mainly worked for were discerning customers. They knew the difference between good and poor workmanship as they had been on the receiving end of incompetent contractors in the recent past and they were vocal about their opinions during the observations. Brent's work was judged by the customers, who could test whether a tap was fixed to their satisfaction by using it. Tenants had feedback forms to complain or compliment the service they were receiving from contractors. Brent fixed things and solved problems while developing relationships of trust with the customers. He promoted the quality of the company he worked for through his own competence and, in turn, his customers were observed as being highly satisfied with his workmanship (wobs Brent, 17/03/2010).

In the case of Brent, his mistakes at work were an important source of learning, but they were also something that other installers sometimes made use of to make fun of the apprentice. In this sense, the mistakes apprentices made were part of their becoming an accepted participant in the work community:

*Geoff told a funny story of Brent trying to block off the spray of water from a tap he dismantled while it was still connected to a live water*

*supply. His peers acted out the scenario and laughed aloud as they described the fountain of water, which sprayed out of the top of the tap, with Brent panicking to shut it off. (wobs Brent, 24/03/2010)*

Brent accepted the humour of his peers and joined them in their laughter, which seemed important to his participation in the work community. All the workers had experienced similar events in their apprenticeships and they found it humorous to recount the stories of the mishaps that they and their apprentices sometimes encountered at work. However, Brent had learned by his mistakes and it was evident from my observations that he was diligent and careful in most aspects of his work as a consequence.

#### **6.14 Discussion of the data**

The findings presented in this chapter would appear to support Wolf's (2011: 7) assertion that a significant proportion of post-16 cohorts experience 'low-level vocational qualifications' and 'get little to no benefit from the post-16 education system'. One of the key issues facing young students was their lack of opportunities for work experience during their full-time training and diminished prospects for finding corresponding employment at the end of the course (more is said on this in subsequent chapters). However, a major issue was also the motivation that these students lacked in the college contexts.

It was the adult students on the full-time plumbing courses who were perceived as being more motivated owing to it being a second chance, a new career, or a business opportunity to become self-employed, which arguably provided them with a greater sense of purpose to engage. Lizzio and Wilson (in Gulikers et al, 2008) supported this notion in their assertion that students' interest and motivation in developing skills was largely dependent on the perceived relevance of the skill to the students' future work. This may imply that some of the college learning was not relevant (or not perceived as relevant) to apprentices' work learning. It could also be argued that most of the adult students had a better idea of their future work needs than many of the younger students, who were found to express a degree of uncertainty about their plumbing career choice in this study. Many of the younger full-time plumbing

students were perceived by some tutors as being misled in taking up plumbing training for pecuniary reasons. In relation to this high demand for training in sectors such as plumbing, Brockmann, Clarke and Winch (2010) suggested that it was becoming increasingly difficult to integrate apprentices and trainees into the workforce to provide the necessary mentorship.

Brockmann, Clarke and Winch (2010) argued that apprenticeship and work-based learning was dependent upon stable employment relations. They asserted that this was no longer the case in Britain owing to the deregulation of the labour market and the increased use of agencies, temporary workers and self-employment (Brockmann, Clarke and Winch, 2010). In this study, it was found that FE provided training for adult students' second-chance careers and preparation for self-employment opportunities in plumbing. However, in light of Brockmann, Clarke and Winch (2010), such increases in the number of self-employed plumbers may further contribute to the destabilisation of the labour market in the sector by increasing competition for jobs. Growth in self-employment arguably diminishes opportunities for apprentices to find work when finishing their apprenticeships and this may also work against the opportunities afforded to younger full-time preparatory students in finding apprenticeships.

In relation to full-time vocational students, Brockmann, Clarke and Winch (2010) argued that government policies aimed at developing a high-skills economic environment had been counteracted because work experience was not included in the vocational training procedure. Brockmann, Clarke and Winch (2010) emphasised the importance of work experience and mentorship of students in the work context. This was reflected in the findings in my study. All five of the plumbing students observed at work were motivated, which contrasted with the lack of engagement that three of these students showed in college.

Brockmann (2010) found the English motor vehicle apprentices in her study to be passionate about cars and this had influenced their career choice rather than it being a second choice. Informal learning experiences had conferred a sense of achievement in the apprentices, helping them develop a sense of purpose, which Brockmann (2010) considered essential in the construction of the

apprentices' worker identity. This is reflective of Tanggaard's (2007: 462) empirical study of craft apprentices in Denmark. The apprentices perceived subjects at trade schools as too abstract and were able to learn more effectively in the workplace. Tanggaard (2007) described apprentices' ambivalence to trade school as a dimension of how they identified with becoming journeymen. She asserted that it may be constructive for apprentices to disengage discursively with college learning if they were staking their identity on trying to connect to the values of work (Tanggaard, 2007). This negativity to college learning also seemed to be the case for the apprentices I observed in my study, who were more inclined to take on the characteristics of their co-workers' identities in the work context. Apprentices took care over their work and they wanted to please their co-workers by assimilating their behaviour in working to high standards and being productive.

In terms of teaching, Guile's case study of the design of a foundation degree in aircraft engineering is helpful in understanding the pedagogical requirements of a curriculum such as that for plumbing, which has separate elements of theory and practice. Guile (2011: 454) problematised the notion of knowledge and skills transfer while acknowledging 'the contribution that the embodiment of knowledge and skill and the constitution of occupational identity make to vocational performance'. In this sense, Guile (2011) recognised the assumptions that are made in vocational types of teaching and learning, which have been discussed at length in this chapter. He asserted that the constitutive role of teaching and learning curriculum had been taken for granted. This has relevance for the findings of this study and the key role teaching has in the learning of plumbing.

Guile (2011) suggested pedagogical continuity in identifying different forms of knowledge required to be combined and sequenced in a vocational teaching curriculum. Guile (2011: 454) also advised that 'lecturers and workplace supervisors devise pedagogic processes to assist learners to engage with these forms of knowledge in educational and workplace contexts' and that 'learners embody and then use these forms of knowledge to support theoretical and practical reasoning in educational and workplace contexts'.

This supports Eraut's (2004) position in questioning an overemphasis on the situated types of work learning described by Lave and Wenger (1991), which eschewed the inclusion of formalised types of teaching. In keeping with Guile (2011), Eraut (2004) suggests that teaching interventions and further learning are required, in order for students to transfer college theory into occupational practice. Eraut's iceberg metaphor describes codified knowledge as the ice above the surface, while below is the further learning required from students to convert codified knowledge into personal knowledge, which is ready to apply in a range of possible situations (Eraut, 2004).

Despite the pedagogical barriers observed and reported on in college, a number of examples of more innovative pedagogy were also witnessed and have been reported on in this chapter. Amongst these was an example of integrated pedagogy, which was observed at college C2 during an NVQ3 gas training module. This example was not about linking classroom theory to workshop practical activities for a group of students, but the integration of theory and practice in the same practical session. The tutor mainly taught practical learning in the workshop environment, so he had adapted his practice to deliver elements of the NVQ3 gas module that were made up of both theory and practical tasks, which related to each other. The tutor also used a range of simulations and cutaway teaching aides to assist students' understanding of aspects of the job, which were then practised in the workshop under supervision. An interactive whiteboard was installed in the workshop, so the tutor was able to combine the teaching of theory with corresponding practical tasks for students to practise in the same session. The students' learning was assisted and supported both by the tutor and between students, engaged in peer-to-peer interactions (Bruner, 1960; Vygotsky, 1978).

The pedagogical approach was observed to include the three key characteristics suggested (above) by Guile (2011), which were continuity of curriculum, a devised pedagogical plan and the opportunity for students to embody and apply their knowledge to support practical reasoning in workshop tasks. The latter included theoretical gas supply pipe-sizing exercises taken from real installations in the workshops, checking existing pipe and appliance installations for gas flow performance and indicating possible reasons for



variations in performance in the system or gas appliances. Students responded positively in their sustained participation and they stayed on task, with few students being distracted in the same way they were in the lengthy three and a half hour classroom sessions.

Such interactions between tutors and students in the context of learning theoretical concepts through practice were supported by the continuity of teaching in that the same tutor was responsible for both theory and practical teaching in the same context. However, the data in the previous chapter (section 5.5) suggested that in most instances, different plumbing teachers were used for the delivery of theory, practice and assessment. This therefore created a barrier for teachers' mediation of theory and practice in relation to the learning outcomes. This situation was also observed by Ofsted (2012: 12) who reported that, 'the apprentices were concerned that they had had five different staff during the seven-month training programme' and 'such poor continuity in terms of staffing had a negative impact on their learning'.

Therefore, the discontinuity of curriculum and teaching along with the lack of opportunities for full-time students to imagine or grasp the whole picture owing to their lack of work experience were key issues affecting students' learning in college. For Dewey (1916; 1938), the notion of attaining a deep and meaningful understanding of theory or subject knowledge without experience was a difficult undertaking. The discontinuity of curriculum and assessment also meant that students had often achieved qualifications in knowledge and understanding of plumbing before they had any sort of practical experience in the subject. Contemporary writers such as Eraut (1994: 160) suggested that the cognitive approach to learning knowledge prior to practical experience raised 'difficult and disturbing questions about the relationship between depth of understanding and long-term performance'. In supporting the notion of continuity of learning, Bruner (1960: 24) suggested that 'unless detail is placed into a structured pattern, it is rapidly forgotten'. Hence, the teaching of specific topics, which are devoid of context in the broader fundamental structure of a field, makes it difficult for students to generalise from what they have learned to what they will encounter later (Bruner, 1960: 24; Dewey, 1938: 47; Dewey, 1910: 176).

Monks (2010) suggested that unless tangible relevance was established, the need to pass exams would become the key motivator and course material would simply be viewed by students as a collection of abstract concepts, which would lead to surface learning. This seemed to reflect the situation reported here, where students were learning the test by rote and perceived the purpose of the classroom learning as related to passing the test. In his empirical study of electronics apprenticeships, Monks (2010) argued that the accumulation of meaningful work experience during apprentices' four-year courses and exposure to real environments placed extra significance on the content of the off-the-job (college) modules to be equally relevant and meaningful. However, it was observed in my study that the college modules lacked this meaningful relevance, particularly because of the way the curriculum was organised in a discontinuous way.

Von Treuer, McHardy and Earl (2013) also emphasised the importance of the relevance and utility of the training programme in encouraging greater trainee motivation. They advocated the implementation of strategies aimed at promoting organisational commitment to the design and delivery of training, which echoed Guile's (2011) earlier pedagogical suggestions. However, the response of some tutors in regard to students' lacking engagement and disruptive behaviour was to take an authoritative and didactic stance. One tutor described his role as a sergeant major, but explained this in terms of his responsibility for maintaining the safety of 'unruly youngsters in hazardous environments' (tutor Alfie C2). It is important to recognise that a plumbing workshop is very different in this respect from a normal classroom. Other tutors who resorted to didactic approaches when challenged with disruptive behaviour voiced their criticism of humanistic approaches, which they perceived to be associated with the students' freedom to manage their own learning.

Tutors seemed to hold little regard for what other studies have identified as characteristics of effective teaching because they reported that much of what was taught in teacher training had little relevance to their own subject area and teaching context. Although some tutors used storytelling to help students imagine and they designed projects for students to do in classroom sessions, younger students still seemed to be easily distracted. Many of the younger

students were described by tutors as lacking the capability for sustained and productive participation in collaborative learning. Hence, students' opportunities to have their thinking and understanding enhanced through the guidance and teaching of others was diminished by their reluctance to engage with each other in peer learning as advocated by Engeström (in Fuller and Unwin, 1998: 160).

It should not, however, be inferred from this that paired working would not work with this group of learners. It may be that the tutors required more training in how to facilitate paired learning and also that the students needed more understanding of the expectations of this type of learning and what the benefits to them could be. For example, Ofsted (2012: 12) described off-the-job taught theory classes, practical training and the chance to mix and share work experience with other apprentices as positive features of apprenticeships. They reported a 'major difference in the learning experience of apprentices' (Ofsted, 2012: 12) where these features were provided. Therefore, it should be possible for tutors to draw on the experiences of employed apprentices to inform and enhance their peers, which was the type of social constructivist approach used by Freire (in Vygotsky, 1978: 131): '...he adapted his educational methods to the specific historical and cultural setting in which his students lived, they were able to combine their "spontaneous" concepts (based on practice) with those introduced by teachers in instructional settings'.

However, few, if any, opportunities for spontaneity appeared to be given to employed apprentices to 'show and tell' or 'share' aspects of their own work to be discussed and critically scrutinised by others. This was largely because most tutors employed delivery strategies that were facilitated by a didactic pedagogical approach. It could also be argued that involving employed apprentices in presenting their own experiences would have excluded those unapprenticed and unemployed students without work evidence to share.

In response to younger students' lack of engagement and motivation, some tutors encouraged participation in theory and practical lessons through gameplay and quizzes to help students participate. In the workshop sessions, tutors sometimes used plumbing competitions as a vehicle for teaching activities, and one college entered students for regional and national skills

events, which often involved whole groups of students. On the one hand, learning through play was 'securing attention by offering the bribe of pleasure' (Dewey, 1916: 97). On the other, Vygotsky (1978: 129) suggested that learning through play allowed students to 'project themselves into the adult activities of their culture and rehearse future roles and values'. Vygotsky (1978: 129) asserted that, through play, students 'achieve an elementary mastery of abstract thought...through the dynamics of their imagination and the recognition of implicit rules governing the activities they have reproduced in their games'. The games observed, which involved students' ability and speed in assembling components of taps and valves, contained underlying rules and processes that were important to competent performance in the job of plumbing. In addition, the games worked well as a way of starting a topic in an engaging way and of helping plumbing students 'embed necessary factual knowledge' (Lucas, Spencer and Claxton, 2012: 83), such as the names of component parts of taps in this instance.

Lucas, Spencer and Claxton (2012: 84) suggested that games 'can work well in the early stages of establishing a rapport with and within a group, as an approach to team-building and better understanding of learners' wider interests'. In my study, games and competitions seemed to be beneficial to the well-being of staff and students in promoting peer interactions and keeping spirits high. In addition, students at C2 were given an opportunity to showcase their skills and abilities in formalised national competitions. This approach highlighted the notion of craft pride to students.

In terms of the working relationships developed with colleagues and mentors in the workplace context, this chapter has outlined the ways in which these were highly valued by the students. Indeed, co-workers were described by the majority of apprentices and adult students as responsive in helping their learning at work. Some described their co-workers as friends and others showed respect for those they had learned from in the field. However, in a minority of instances, there were sometimes barriers to apprentices' learning. The example used in this chapter was of one apprentice who found a group-based training scheme frustrating. Whilst this was not a common experience for

these students, it is worth commenting on here because of the attention these sorts of schemes have attracted in the wider literature.

Group-based training schemes are where apprentices and trainees are contracted not to a single employer, but to groups of employers who provide different parts of the training. Brockman, Clarke and Winch (2010) suggested that group-based training schemes were a way of increasing the opportunities for apprenticeship placements in order to provide the necessary work experience for trainees' occupational learning. There is also a good argument for this type of apprenticeship approach because learning in different types of occupational communities arguably present more expansive opportunities for learning through boundary crossing than being restricted to a single firm or employer (Fuller and Unwin, 2008).

However, the example discussed in this study suggests that sufficient opportunities to learn are not always provided for apprentices and this may be exacerbated by moving apprentices who are already settled to different firms. In this instance, the apprentice only had a temporary status in a different work community and, for this reason, his opportunities for learning became restrictive (Fuller and Unwin, 2003). Those he worked for had little to gain by contributing to the training of a 'visitor' and, instead, they capitalised on his labour by giving him repetitive, unskilled work, which is characteristic of a restrictive apprenticeship (Fuller and Unwin, 2003). Lave and Wenger (1991) describe apprenticeship as an integral part of generative social practice, dependent upon legitimate peripheral participation in work communities. Legitimate peripheral participation is where the apprentice has a growing involvement with the work community and the conditions legitimise the apprentice's gradual participation in taking on increasingly challenging activities over time (Lave and Wenger, 1991). However, it is argued here that in group-based training, there may be a greater risk of apprentices occupying their time on the peripheries of practice rather than moving towards a more legitimate participative role in the occupational community, which was the case for one apprentice in this study (Fuller and Unwin, 2012).

It has also been reported in this chapter that the apprentices' learning at work with co-workers had positive benefits for their learning in college in comparison to full-time students. Apprentices were perceived by many tutors as more capable of understanding and imagining the meaning of the taught knowledge aspects of plumbing because they could relate theory to real events at work. Consequently, apprentices were reported by many tutors as easier to teach than full-time students. Apprentices were reported by tutors as often already competent in many practical performance activities taught in college because they worked under supervision for four days a week, sometimes for up to four years. Therefore, apprentices were reported by some tutors as quicker and more efficient in performing practical tasks in college, despite the fact that they were often disengaged by formalised types of classroom teaching.

Vygotsky (1978) recognised that some forms of teaching, such as oral lectures, may obstruct students' learning; which was alluded to by Lave and Wenger (1991). Alternatively, Vygotsky (1978) favoured social constructivist strategies for learning in social groups involving adult guidance and collaboration of students with their peers. Vygotsky's (1978: 131) ideals for social learning were expressed through his theory of the zone of proximal development, which was: 'The distance between the [apprentice's] actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers'.

Vygotsky viewed learning 'as a profoundly social process' (1978: 131) in the varied roles that language plays in instruction and in mediated cognitive growth through the emphasis of dialogue. In most instances observed in the work context, apprentices were closely supervised by more experienced co-workers. As apprentices became more experienced, they were given increasingly challenging tasks to complete on their own, but they were always supported in the risks they took with learning (Lave and Wenger, 1991). Apprentices were rarely alone but when they were, they had mobile telephone communication with their co-workers, who were on hand to help. Vygotsky's (1978) social constructivist approach inspired Bruner's (in Hewitt, 2010: 111) theory known as 'scaffolding', which focuses on the structuring of learning. Applying Bruner's (in

Hewitt 2010: 111) structural concept to apprenticeship allows the role of the more able co-worker to 'scaffold' the student in the learning of those aspects of an activity that they were unable to do at that point on their own. Hewitt (2010: 111) suggested scaffolding may take the following forms:

- Physical manipulation of objects on behalf of the learner
- Formulating approaches to problem-solving to support the learner
- Remembering steps in a task
- Emotional support for a learner during a task to maintain their attention, interest or participation in the task.

Rush et al (2010) emphasised the importance of high-fidelity simulations and work learning, explaining the need for constructivist approaches where students' knowledge is facilitated by more experienced professionals who are able to show and model how to understand. In these scenarios, vocational teachers or co-workers help students reflect on their acquired knowledge and deal with complex, ill-defined or risky situations (Rush et al, 2010). However, this chapter has explained how teaching in college in terms of relating theory and practice were often obstructed and simulations were often low-fidelity in nature. In contrast, students responded with motivation to the authenticity of real tasks in the workplace and to their co-workers, who were always on hand to help, which made the workplace an important site for learning.

According to Billet (in Rush et al, 2010: 471), work-based learning promotes the construction of knowledge through contextual experiences 'including authentic (realistic), goal-directed activities, access to guidance, both close assistance from experts and "distant" observing and listening to other workers, and everyday engagement in problem-solving'. In some instances, apprentices were observed making mistakes and correcting them, which was integral to the learning process (Cohen, 1999). In making mistakes through taking risks in the process of work, apprentices demonstrated their willingness to participate and take on increased responsibilities.

The apprentices' ongoing engagement in authentic tasks at work under the critical eye of their co-workers distinguished their experiences from the full-time

students, who were often restricted in their learning in college contexts. In addition, the full-time, unapprenticed students who went on to become self-employed following the technical certificate course did not often have the benefit of supervision by co-workers. For employed apprentices, learning at work also helped them identify with their co-workers in working to high standards and being subject to customer and client expectations and external quality inspections. The apprentices I observed were indeed developing an increasing sense of identity as master practitioners and they were motivated in working to high standards expected of them by their employers.

However, socially-recognised occupational identities, outlined in the introductory chapter and referred to by Keep and James (2011), such as journeyman and master, were not apparent in my study. These were intentionally made redundant in England with the introduction of NVQs. Michael Young drew on the work of Susan James (in Young, 2011: 265) to describe how NVQs and frameworks for assessing workplace learning 'would replace the combination of 'master craftsman judgement' and "time serving" associated with traditional apprenticeships'. Nonetheless, it was observed in the exploratory pilot study that the experienced 'old-timers' were sometimes referred to as 'Jedi'. This term is taken from contemporary film culture (i.e. the *Star Wars* films), where the Jedi are the masters. Workers did not seem to have a means of formally describing the highly-skilled craftsmen on site, but the use of the term 'Jedi' was a way of expressing respect, albeit in a comical manner.

In summary, apprentices benefited from the teachings of their masters or co-workers and this was reflected in the tutors' comments about apprentices' capabilities in college compared to full-time students. Although the literature suggests that time-serving had ended in apprenticeships, it was apparent that apprentices in this study were learning at work over periods of up to four years. During this time, they were continually guided and corrected in the workplace and they took supported risks in working productively to the standards expected of them by their co-workers and customer/clients. Apprentices embodied their skills and knowledge through situated activities in the context of the workplace and the findings in this study suggest that these experiences could not be learned or replicated as effectively elsewhere (Lave and Wenger, 1991).



### 6.14.1 Comment on the policy context

In turning to the policy context, it is important to consider the introduction of 'The Further Education Teachers' Continuing Professional Development (CPD) and Registration (England) Regulations' (DIUS, 2007a) and 'The Further Education Teachers' Qualifications (England) Regulations' (DIUS, 2007b). These marked a key government intervention in regard to professionalism and improving teaching quality in the FE sector. The Institute for Learning (IfL) was appointed as the governing body for FE teachers, and they sought to address issues of professional identity and professionalism. This was in order to improve the status of teachers in the FE sector, bringing a parity of esteem for FE lecturers/teachers to align them with the schooling and university sectors. The regulations stipulated compulsory registration with IfL for all teachers, which included adherence to the IfL Code of Professional Practice and associated processes that provided benefits for members (i.e. the status of professional membership and ongoing recording of continuing professional development).

In an attempt by the Labour government to improve teaching standards, the 'Further Education Teachers' Qualifications (England) Regulations' (DIUS, 2007b) stipulated that new entrants had to have the Preparing to Teach in the Lifelong Learning Sector (PTLLS) qualification. They also introduced the related certificate (CTLLS) and diploma (DTLLS) for those seeking Associate Teacher Learning and Skills (ATLS) or Qualified Teacher Learning and Skills (QTLS) status respectively. However, both sets of the DIUS regulations (2007a; 2007b) were later revoked following the Lingfield Review (BIS, 2012b: 7), which stated:

*As well as removing statutory obligations in respect of IfL, this will remove the statutory obligations for teachers in colleges to hold or obtain particular qualifications, and to undertake at least 30 hours of continued professional development. The panel has observed that the current regulations are flawed in a number of respects and their scope is incomplete. Furthermore, the regulations place obligations on individuals which in practical terms are only enforceable through placing matching requirements on their employers.*

In light of the findings in this study, the revocation of these CPD and teachers' qualifications regulations means there is currently no requirement for plumbing tutors working in FE to either possess or obtain formal teaching qualifications in order to teach in the VET sector. It is left up to individual colleges to decide whether to insist on a teaching qualification from their teachers. This situation must have implications for effective teaching and must further compound the problems of didactic teaching and lack of diversity in teaching strategies that were observed in this study. Although there were numerous examples of what appeared to be good quality teaching in this study, it was apparent that many teachers held little regard for theories and teaching strategies valued by many in the vocational teaching sector. These findings are consistent with those reported by Faraday et al (in Lucas, Spencer and Claxton, 2012: 29) in relation to vocational teaching, who 'found that teachers do not tend to make use of teaching models when deciding what teaching strategies to use to respond to particular learning objectives'. Despite the fact that many plumbing teachers in this study held teaching qualifications and mandatory membership of IfL, the vast majority seemed reluctant to see themselves as teaching professionals. They did not identify with the IfL notion of the dual professional (i.e. both teaching and vocational expert) but instead perceived themselves (as did their students) as experienced plumbers who taught in FE.

In a similar way to the teachers, the apprentices also failed to be reflexive in recognising themselves in terms of their professional identities. They saw themselves as apprentices to the plumber and fitter occupational identities of their co-workers. It was apparent that the emphasis of training was focused on the apprentices' attainment of good educational qualifications in line with the government's (1997-2010) policy. This policy counted the number of successful apprenticeship completions as the key characteristic of apprenticeship quality (LSC, 2009: 49). However, the focus of government policy on apprenticeship completions in light of college-based qualifications meant that little, if any, explicit recognition was paid to the value of work-based learning. The importance of work experience and the significance of professional identity in the training processes were inconspicuous, along with the status of journeyman, engineering technician and master, as recognised outcomes of apprenticeships. This was the case despite both teachers and apprentices attaching significant

value to their extensive work experiences in the field rather than to their vocational qualification achievements.

The next chapter will explore the tutors' and students' views of the assessment system for the college-based technical certificate and the NVQ, which required assessor observations of students at work. The chapter demonstrates the differing views that were held in relation to these approaches to assessment.

## **7 Assessment**

### **7.1 Introduction**

Moving on from the students' and tutors' perceptions and experiences of teaching and learning in relation to plumbing, this chapter will focus on the matter of assessment. As stated in chapter one, the assessments that these students engaged in had changed relatively recently. Whereas once, these had been undertaken as a series of paper-based assessments (with supplementary verbal questioning if it was deemed necessary), they had been changed so that they were to be taken as regular, computer-based, online, multiple-choice tests, known as Gola assessments.

This chapter will explore the tutors' and students' views of this assessment system for the technical certificate, and the NVQ assessment system that was required of the students in their work placements. The chapter demonstrates the differing views that were held in relation to this system. It shows that even whilst the majority saw it as highly problematic (mainly due to its perceived relation to knowledge and understanding, which might have been achieved on the course and would eventually relate to performance competence), a number of benefits were also considered to exist. These included the fact that it might aid some wider inclusion and that it helped deal with real practical concerns about testing large numbers of students. The chapter concludes with a discussion of these key themes, particularly in relation to the concept of high- and low-fidelity simulation in assessments.

### **7.2 The advantages of the multiple-choice, online Gola system**

Many of the tutors who participated in this study had experienced the previous paper-based assessment system for plumbing. In interviews, they often spoke of the differences between this old system and the new online Gola system. For some, this had brought a greater level of convenience to the process of assessing candidates' subject knowledge of plumbing:

*It's a very convenient way of doing it...it is Gola testing all the way through really, up until the end of their level 3. Basically, in their fourth year, if they go right the way through. (tutor Den C2)*

*It's an easy way...it's a set standard, it's on computer done by Gola... they can regulate it very easily. (tutor Matt C2)*

For the previous paper-based assessments, some failing students had been entitled to verbal questioning if their score was near the pass mark. However, some tutors told me that when teaching groups of twenty or more students, this assessment had been difficult to implement as the verbal questioning was both time-consuming and difficult. The Gola system removed the need for tutors to conduct verbal questioning and a small number of tutors considered this an advantage:

*The only benefit that I have is that I no longer have to ask oral questions because they are getting straight pass or fail. (tutor Mike C1)*

Tutors no longer had to mark assessments personally, nor did they have to give verbal feedback to failed students. In addition, tutors had less student information to store securely for external assessment verification purposes. Tutor Kim (C2) suggested that an advantage of Gola was that it reduced the risks of cheating because students were doing slightly different exam papers simultaneously. In concurrence, assessor Luke (C2) said:

*I think the online assessment is good because each person gets asked different questions. (assessor Luke C2)*

Some students also mentioned the fact that they liked the Gola system. In particular, those students who struggled with the literacy aspects of the course felt a sense of achievement when they had passed the college theory assessments. They described passing tests as a signifier of their progress and something they liked about the course:

*I do enjoy the exams and that because it does give you a bit of a confidence booster when you do pass. (adult student Jason C3)*

*[I like] getting results from exams because I want to pass and get further on and get qualified. (adult student Gary C3)*

The Gola assessment process seemed to provide a form of inclusion for some students who may have found extensive written tests more challenging. Progressing in the assessments had brought Jason and Gary some degree of confidence and a sense of belonging in an educational environment (something they had disliked in their teenage years). Cathy was also one of the adult students who had benefited from the Gola, saying:

*I am not very good at getting my words out of my head and onto a piece of paper. (adult student Cathy C2)*

Cathy was observed as confident in the practical lessons but, by her own admission, she struggled with some aspects of theory. However, the multiple-choice exams had helped her to engage and progress in an occupation she wanted to learn and pursue as a career in order to support her family (cobs C2, 03/09/2009).

### **7.3 Perceived problems with the Gola system**

Not everyone was always so positive about the Gola assessments, however. When I asked the tutors in formal interviews about the relation between teaching, learning and assessment, a number of them suggested that the tests might actually exclude rather than include those with literacy problems. Some tutors suggested, for example, that some assessment questions could actually be quite difficult to understand for those students who struggled with literacy:

*A lot of the questions we are getting on the online Gola from City & Guilds, the wording, it's not in plain English. (tutor Norman C3)*

*...sit them in front of a computer that is multiple-choice! He reads the question wrong, struggles with the terminology. (tutor Terry C2)*

Consequently, over half of the tutors across the three college sites stated that students would sometimes be inclined to guess the answers if they did not understand the question or know the answer. These tutors suggested that guessing was also prevalent in assessments and was sometimes the reason why some students passed, who had been considered by tutors as likely to fail:

*It's just a multiple-guess, isn't it really? (tutor Alfie C2)*

*There will be those that get through because they have guessed. (tutor Terry C2)*

Tutor Terry felt that the verbal assessments may have been fairer for those who struggled with literacy and that the Gola assessment system was rather more challenging for them:

*The weaker [student] that I can verbally question on a task in the workshop, they know that, no problem. (tutor Terry C2)*

Gola was also perceived by tutors as especially unsuitable for those students who were more inclined to practical types of learning, which related to the majority of the population of students learning plumbing in this study. In contrast, however, only a minority of students confirmed that they found the wording of the questions difficult. Instead, they were more inclined to comment on the fact that the multiple-choice nature of the test felt punishing and was sometimes tricky to negotiate:

*When you are given four answers, it's almost like 'catch-you-out'...I am not sure it's such a great system. (adult student Jess C2)*

Jess's suspicion of the test and her negativity about the multiple-choice system was not something that was reported by everyone. Indeed, the most prominent

response from students in relation to multiple-choice tests was that the vast majority of them found them easy:

*I think it's quite good, well, kind of easier than doing a written test...It's guesses really. (Connor C2)*

*Well they are quite easy, one out of four...Sorry, they could be a bit harder if they wanted to be. (Jake C2)*

*I have not failed one exam, I have flown through them. I just find them a little bit easy. (adult student Jason C3)*

The multiple-choice questions offered a chance to guess answers, which some students found comforting. In addition, there was no need for students to write anything during the assessments for the technical certificate level 2.

#### **7.4 Teaching for the assessments**

In terms of teaching and learning, the tutors did express some support for the Gola system because they felt that it did encourage them to teach the whole curriculum:

*You don't fully know what is coming...you have to cover it all. (tutor Kim C2)*

As assessor Luke (C2) stated:

*I think it's a fairly good idea that way because it doesn't matter how much you are trying not to, if it's question papers, you will veer toward teaching to the paper. (assessor Luke C2)*

Because the tutors had subject-specific modules to deliver that corresponded directly with the individual Gola assessments, they often perceived the tests as advantageous in reducing the pressure for them to 'teach to test'.



However, there were some tutors who questioned the demands placed on them as they endeavoured to deliver this broad curriculum in a short space of time, but in enough depth so that the students were able to achieve their qualifications:

*...the time we have to deliver it is unreasonable...there is a huge amount of stuff we have to deliver, it's a massive amount; it puts the staff and students under pressure. (tutor Larry C1)*

Tutor Terry (C2) summarised these concerns when he said:

*We have got to move along at pace to cover the syllabus. (tutor Terry C2)*

His comments reflected the way that tutors generally felt under pressure to improve student achievement targets despite the extensive range of taught theory modules. Some tutors did actually talk about the ways in which this might mean a move to teach some parts of the curriculum in more detail than other parts. These tutors did see that this sort of teaching for the test was inevitable, even with the new system:

*We try to give them stuff that will be asked in the online exams. (assessor Dave C2)*

*I know what is going to come up in the test, so I set an activity that helps them to hit that mark. (tutor Terry C2)*

Of course, this 'teaching to test' was not a strategy adopted by everybody and it was certainly not what I regularly observed as I visited the colleges. It did seem to be the case, however, that students spent a significant amount of time revising for tests in their college lessons. As Curtis (C1) told me:

*We did the whole day for revising. (Curtis C1).*

This was common for students at all of the three college sites. However, reflecting the views of many students, Steve (C1) said:

*I learn more from past paper questions and worksheets than off the board. (Steve C1)*

In keeping with this, the majority of candidates associated the purpose of the theory lessons as mainly related to helping them get through the exam:

*...we are actually being spoon-fed what is going to be in the exam, near enough. (Oz C2)*

*They give you sort of exam questions, you're not learning the full depth of it; you're just learning what they think the exam questions will be. (Charlie C3)*

*They just give you what you need to get through the exam. (Chez C1)*

*...they are only interested in theory to get you through the exam. (adult student Gary C3)*

Some students at one college described the revision software disk they had purchased online to help them with their assessment preparation at home. The students and apprentices were keen to point out the similarities between the questions contained on the disk and those they encountered in the City & Guilds Gola assessments:

*I would say that I probably done about six or seven different re-take exams on it...they are quite helpful really, I was quite surprised how similar. (Sammy C3)*

*A lot of questions you get in that practice exam, you get in the actual exam. (adult student Jason C3)*

Adult student Jason explained how the use of the revision disk had helped him to pass the assessment, but he questioned the utility of the knowledge being tested. He stated that the test did not assess technique or know-how. Jason might be considered as having good grounds for his comments because he was included in the group C3 with Charlie, Sammy, Gary and John who passed the central heating assessment at level 2, early in the first year of college attendance after only one day of tuition.

## **7.5 Motivation and measuring achievement**

It was often the case that tutors felt that the students were more inclined to engage with the assessments and to have a go at the tests because they could resit the assessment the following week if they needed to:

*They get a second attempt. They soon learned that happens and if you spoke to them, nine times out of ten they would say, 'I didn't revise'.  
(tutor Matt C2)*

*I think the online testing and keep on going back until you pass the exam is not a very satisfactory way of doing it. (tutor Den C2)*

This was not always regarded as something that was positive, especially because the tutors felt that this led some students to believe that there was no need for revision. Students were not charged for resits, so there was no expense to them for failing an assessment. The resits were usually organised for the week following the assessments, which were also booked externally to run concurrently. As tutor Norman (C3) commented:

*We have no control over the re-takes of the exams, which are governed by the exams office at the main site. (tutor Norman C3)*

This practice was observed at all three of the college sites in the study. Hence, the external control of continual resits created a situation where students had little choice but to resit and tutors were expected to be complicit in the process:

*...if I think a student is not ready for the exam, I have still got to book it when he comes back, and that is pretty hard to judge. (tutor Mike C1)*

*If a student is doing really well in the practical but then keeps on failing these online tests, it's going to have a knock-on effect for his or her feelings as well. (tutor Kim C2)*

A minority of tutors reported being expected to enter students for assessments that they were clearly not ready for, which they felt was detrimental to students' feelings and sense of achievement on the course. Tutor Gordon summarised the general tutor sentiment across the three sites when he stated that the emphasis was entirely on passing the test and students were continually resitting until they achieved. Many tutors perceived the assessment process as beyond their control and felt under pressure to get students through tests. Some considered the process as detrimental to students' learning and possibly the reputation of the trade:

*We obviously need the student to pass as well as the trade discourse, that we are trades people and we want our trade to be represented well in the future. At the same time, we have an employer and we are being paid for this and if the student doesn't pass, we are not getting paid and that is the important thing that goes all the way through. (tutor Mike C1)*

*The situation we find ourselves in with students, which is unforgivable really, is that we are not in a position to fail a student, which I find most difficult. It devalues the qualification for someone who is competent and because of the numbers, retention, achievement, the pressures we are all under, success has to be success and there are questions asked at why it is not 100%. I think the culture is extremely detrimental to learning. (tutor Gordon C3)*

## **7.6 Teaching, learning and assessment**

Besides the process of students doing multiple resits to pass, many tutors questioned the competence of the assessment instruments for assessing a

candidate's knowledge and understanding. In other words, the majority of tutors questioned the fitness for purpose of the assessment method:

*... I don't think it really tests peoples' understanding of what they are doing. (tutor Den C2)*

*I currently think that the exam procedure of multiple-choice is not fit for purpose. (tutor Bill C3)*

Students echoed the tutor sentiments with regard to the multiple-choice assessments being used to test knowledge and understanding. The majority of students knew that multiple-choice questions were not a good way of testing their knowledge or understanding of plumbing:

*It doesn't really test your knowledge sort of thing. (John C3)*

*You are taught something and then you are given a multiple-choice test that you have got to get 70% on, which I don't think it tests your knowledge at all, it just tests your memory. (Oz C2)*

*...you do miss the understanding between what you have read and what you are doing. I don't think that Gola and the multiple-choice questions get that information out of you. (adult student Cathy C2)*

Cathy (C2) suggested that the test was relevant to the chapter in the book that accompanied the course. She knew that the assessment required her to recall an answer rather than it testing her understanding. She questioned the competence of the assessment method in testing her understanding and suggested that the assessment should require more than recalling simple facts contained in the course manuals and should be related more to what they were doing.

As stated previously, much of the convenience associated with Gola assessment lay in the fact that tutors did not have to give verbal feedback on

knowledge assessments. However, many tutors viewed this as an important aspect of teaching and learning:

*I think that is the best way they can improve, telling them what they have done wrong. Well, constructive feedback on how they could have learned at every assessment. (tutor Darrel C3)*

Tutor Matt (C2) said:

*At least with a paper-based test, I could go through the test afterwards...to make sure that they actually go away knowing it. (tutor Matt C2)*

As an alternative to Gola, some tutors expressed their preference for written assignments or assessments as a means of testing candidates' subject knowledge of plumbing:

*It's got to be written question papers; they got to come up with the answer. (tutor Terry C2)*

*They do one exam at level 3, that is 'open-book' and it's a challenge and it makes more of that qualification. It's more deserved if they have gone through that than if it's an easy multiple-choice test. (tutor Matt C2)*

Some tutors suggested that written assignments would be more challenging for students and they perceived this as adding value to the qualification. Aspects of the exam at level 3 were described by tutors as 'open book', which allowed students to research with books and resources when sitting the written assessment. Tutor Larry (C1) reflected the sentiments of some of the other tutors in saying that he would like to see more diagrams being drawn by students as means of assessing students' understandings of systems and components. Tutor Mike (C1) explained that a written assessment paper would

*show that the student understands and comprehends what it is they are supposed to be doing. (tutor Mike C1)*

Some of the other tutors seemed to agree with this notion. Tutor Terry (C2), for example, talked about the practical difficulties that the written test might bring with it, but also the advantages that it might have had for the students in relation to their literacy skills:

*Having seen them in a written exam, they struggle with a written exam in that sense, but I think that would bring up the standard...one of our jobs is to raise the standard of their key skills and basic skills while they are doing plumbing. The only way to do that is to get rid of multiple-choice question papers. (tutor Terry C2)*

It is interesting to note that this was not a singular opinion either because tutors across the three sites expressed their support for the use of written assignments as an assessment methodology. Written tests were preferred to multiple-choice tests even when being used with students who had literacy difficulties.

From the students' perspective, the majority were happy with the ease with which they could achieve the qualification, but some commented constructively about what they would like to see change in the assessments. Oz (C2) commented on the need for one written examination at the end of the NVQ3, which would be in the fourth year of study in his case. He also asserted that written exams would be more appropriate than Gola, implying that they would test more than just memory. However, in contrast to the tutor comments, only a few students suggested that written exams or assignments would be a better way of testing their knowledge of plumbing theory. Many more students argued that verbal questioning would be a more appropriate way of assessing knowledge:

*Sometimes, I actually think your knowledge is better [assessed] from open-book or a written test or talking to somebody about it. (adult student Jess C2)*

Jess approved of the previous in-house examination system for plumbing prior to Gola, which gave some discretion to tutors to provide feedback on the questions that students had got wrong. She said:

*With the lads, you ask them something and they will know it from doing it.  
(adult student Jess C2)*

Jess also thought that verbal tests with open-book resources would be a more appropriate way of assessing students' knowledge, which concurred with some of the tutor comments.

### **7.7 Assessment of learning in the workplace**

Assessments did not only happen in the college, however, or just in relation to the more theoretical work that the students undertook. In order to be eligible for the NVQ, the apprentices and adult students in the colleges in my sample needed to have completed or be doing the technical certificate. Therefore, much of the theory and practical training and assessment had already been completed as part of the technical certificate in college prior to the NVQ. For NVQs, apprentices and adult students were required to present on-site evidence to meet the qualification criteria. This evidence was stored by the candidate in an on-site portfolio. It consisted of evidence that had been signed by an on-site recorder, such as a plumbing supervisor or competent plumber at work. The on-site portfolio also consisted of evidence observed by an on-site assessor from the college or training provider, who made between two and four visits to the workplace.

There were some, like adult student Jason, who struggled in this respect because they did not have a qualified plumber/supervisor or person as their on-site recorder. The following field note explains how the on-site assessor from the college dealt with the issue of Jason not being supervised in regard to the NVQ assessment:

*The on-site assessor points out that because Jason does not have a qualified plumber working with him on-site, then he would have to make*



*more visits than usual in order to sign off the portfolio. The on-site assessor stated that he would sign off the work that was presented by Jason, but he would make six visits to site instead of the usual four (wobs Jason, 09/07/2010).*

What this field note demonstrates is the flexibility that existed in this on-site assessment system. Because the tutors were allowed to deal with such matters at their own discretion, it meant that those students doing a full-time college or day-release course did not necessarily have to be employed or supervised in the workplace by a qualified person in order to be assessed for the NVQ. This flexibility was a real positive point for adult students like Jason, who had already spent a number of years doing the job of a plumber without formal qualifications.

There were, however, some questionable outcomes associated with this process, particularly for those doing technical certificates on full-time plumbing courses and who later became self-employed. This was a point that I introduced in chapter one, where it was reported that Unite (2010) had raised concerns for students who were working unsupervised in peoples' homes because of the way in which it presented a risk to public health and safety. From the data generated in this study, we can see that this could have been the case for some of the participants in the project, particularly those on the NVQ who did not do apprenticeships and were only required to present minimal evidence for their on-site assessments. This was a point that was sometimes raised by the college tutors too. They expressed particular concern that it might also be a process that worked to undermine the concept of apprenticeships.

## **7.8 The divide between college and work-based assessments**

Previous chapters have discussed the common perception that there was a divide between theory and practice in plumbing education and also between the teaching and learning that happened at college and in the workplace. A similar sort of divide was seen to exist between the assessments undertaken at college and those undertaken on-site. This is captured in tutor Bill's (C3) comment:

*On-site assessment is a much more beneficial way to assess a student's learning...We over-assess too much in the college and we do not do enough in the workplace. (tutor Bill C3)*

Tutors were critical of the college-based practical training in that they felt that it did not accurately represent many of the situations that plumbers regularly faced in the work context. Therefore, full-time students were not getting the training that apprentices were getting in the workplace. The following field note extract describes an observation during Jason's (C3) on-site assessment that reflects some of the reality of the work environment:

*Jason starts on the pipework and demonstrates his understanding and skill by carrying out the notching tasks to the assessors' satisfaction. The site assessor takes a number of photos, but concedes that it is very difficult when site conditions are not always 'what we would expect from a safety manual' (wobs Jason, 09/07/2010).*

The assessor was hesitant to take a photo of Jason precariously notching wooden joists with just a small platform on which to work. Such an image may have shown contraventions of health and safety regulations, written in a safety book in relation to safe access. The assessor's comment reflected the realistic nature of building sites, which presented different circumstances and variations in performance requirements to those specified in books.

In the case of apprentice Curtis (C1), he was mainly involved in plumbing maintenance and so he lacked evidence of installing sanitary appliances. He was struggling to present the necessary evidence for his NVQ2 for sanitary installation and hot and cold water. However, it transpired that only minimal installation evidence was required for the NVQ2 on-site assessment for plumbing:

*The evidence presented by Curtis for his practical on-site assessment was observed to include the installation of a toilet pan, cistern and lavatory basin. The on-site assessor stated that Curtis had satisfied the minimum requirement of 1.5m of pipework installation by providing a*

*15mm copper supply to an over-sink water heater. The on-site assessor pointed out that the on-site assessment was mainly about recording health and safety evidence (wobs Curtis, 16/02/2010).*

For Curtis, his on-site evidence met most of the on-site installation competence requirements for the plumbing NVQ2, which were hardly representative of the range of installation and maintenance required of a plumber. There were those, like adult student Jason, who felt that the requirements for on-site assessment were actually a little too low. I observed evidence of adult student Jason's installations of water mains, bathroom suites, sanitary pipework, central heating and gas pipework to eight flats. However, extensive installation work was not a requirement for the plumbing NVQ on-site assessment and adult student Jason's five years of plumbing experience was not considered either. From his own perception of NVQ2 on-site assessment, adult student Jason described the evidence requirement as 'pretty basic' (wobs adult student Jason, 19/05/2010).

It was not just the amount of evidence that was a problem with the NVQ, however, because there were also variations in the quality of work, which tutors and assessors commented on:

*You have students that have excelled and sailed through the course and those that have bumped along the bottom, but they both get the same qualification and it's almost a 'dumbing-down' of the qualification. (tutor Mike C1)*

Tutor Mike (C1) suggested that there was a lowering of the standard for plumbing qualifications. This was echoed by on-site assessor Luke (C2), who explained that those students and apprentices producing work to a high standard received the same grade as those meeting the basic qualification standards, which he described as being set extremely low. At least one tutor or assessor from each of the colleges in the study called for the grading of apprentices in assessments:

*...pass, credit and distinction...would go a long way to rewarding people who worked hard. (tutor Larry C1)*

However, the call for the grading of assessments was further evidence that the assessment of competence had become standardised at the minimum level of performance. Tutor Darrel (C3) was previously employed as an on-site assessor and he described some work presented for on-site NVQ assessment, which he considered to be of a very poor quality and degrading to the reputation of the qualification:

*I have gone out and assessed students that have got their tech-certs only, from a different college or training provider, and they haven't got a clue, not a clue...Whereas you wouldn't have them in your house and you know they have got no experience...it does degrade the qualification...he had a nice sign-written van saying 'Plumber, City & Guilds'...but looking at the job he done, it was shocking really. (tutor Darrel C3)*

Although many tutors and assessors were positive towards full-time adult students progressing in the plumbing industry through self-employment, some expressed their concern for preparatory courses and qualifications because students did not acquire the necessary work experience to become competent. An on-site assessor told of how he had to terminate the assessment of two tech-cert graduates on an on-site NVQ2 assessment. The students failed to locate the isolation for the mains water supply for the job they were doing and hence could not start the job they intended to do. The assessor described locating the position of the mains stop-tap on the pavement outside as basic knowledge for practising plumbers. However, the full-timers who were being assessed had not experienced this other than in books and simulations in college where the mains water isolation was always easy to locate and isolate (cobs C1, 28/10/2009).

## **7.9 Discussion of the data**

Black (2001: 72) argued that 'standards imposed by the pressure of external tests can be counterproductive in that they can damage classroom teaching and learning', which seemed to be the case in this study. The consequences of

using multiple-choice for external tests were described by Ecclestone (2002: 20, 36) as rewarding short-term goals and as replication of information, leading to the side effects of surface learning to get through the test. Many students in this study considered the purpose of the theory lesson or curriculum as aimed at preparing them for the test rather than helping their understanding of the practical aspects of the course. Indeed, Ofsted's (2012: 12) apprenticeship study also reported that 'in interviews with apprentices, many of them felt that the focus of their assessors was much more on assessments than on developing their knowledge'.

Reflecting both Ofsted (2012) and Ecclestone's (2002: 167) experiences, most of the teachers and students in my study viewed assessment as about meeting requirements and not about deepening their learning. Brockmann (2010) asserted that such instrumental assessment regimes countered any possibility of engaging young people by arousing their curiosity, which seemed to be the case for the young students and apprentices I observed in college contexts. The findings presented here also support Biesta's (2004: 248) argument in relation to the accountability culture in education, which redefined political relationships between people in economic terms such as 'provider/producer-commodity-consumer'. Biesta (2004: 248) suggested that notions of educational quality had become meaningless and associated with 'process and procedures rather than content and aims'.

However, it was not only the impact of the instrumental assessment regime and assessment methodology on the curriculum that affected younger plumbing students' motivation in this study. A situation existed where it was very difficult for students to actually fail a theoretical assessment because they were able to keep re-sitting the test until they passed. The institutional ethos around testing was described by one tutor as 'unforgivable' (tutor Gordon C3) because of the pressures on teachers to ensure 100% achievement. The test culture in this study was considered by many tutors as detrimental to both the quality of learning and to the trust in the quality of the qualification. The findings suggest that all three colleges in the study were bound by externally-monitored performance indicators, which included cycles of recruitment, retention and certification linked to college funding and resources (Bloomer in Gleeson,

Davies and Wheeler, 2005; Lloyd and Payne, 2012). Stanton and Bailey (2004: 23) pointed out that those who assessed NVQs were often people whose salary was dependent upon the candidates being deemed to have passed. Whilst this was not the case in this study, mainly because the knowledge tests at least were taken online and independently from the tutors, we can still see the pressures that were placed on them by this assessment system from the tutors comments about teaching to the test and ensuring students did not fail.

An additional argument made by Young (2011) is that these types of NVQ assessments have left people with very little trust in their point, their purpose and their validity of measurement. Young (2011: 264) explained that the NVQ assessment tasks were 'taken over by the Awarding Bodies who, funded by government, developed a complex hierarchy of assessors, and internal and external verifiers in an attempt to guarantee quality'. According to Young (2011), the old qualifications, prior to NVQs, were based on trust between people such as masters and apprentices and teachers and students. However, these were assumed to be defective and, as such, were replaced. Young (2011: 264) asserted that, although these NVQ procedures were designed to replace this trust between people, 'they did not create a basis of trust in the new qualifications'.

The findings in this study support Young's (2011) position in that few tutors in my study had trust in the assessment procedures and methods. The emphasis of the curriculum on theoretical types of delivery along with the (in)efficiencies in the assessment procedures were of economic benefit to all the VET institutions concerned, but were arguably detrimental to the students' learning, welfare and opportunities for progression. Moreover, the tutors' subjection to institutional pressures to participate in dubious qualification procedures along with their above-cited unease about full-time plumbing courses for young people led them to feel uncomfortable about the situation. Moreover, the tutors' sense of doubt regarding the plumbing qualifications were further compounded by the nature of the practical curriculum and assessment.

The data presented here demonstrate the ways in which these tutors and students felt that the apprentices were being taught and assessed in college

situations that were not representative of the realistic learning environment found in the workplace. It is important to consider the notion of competence when considering practical assessments related to NVQs. Jessup's (1991) doctrine is a useful reference in regard to what was intended for NVQs and what has actually transpired. Jessup (1991: 27) emphasised 'the need for work experience to be a valid component of most training which leads to occupational competence'. Moreover, he (1991: 27) asserted that occupational competence 'leads to increased demands for demonstrations of competence in the workplace in order to collect valid evidence for assessment'. However, Jessup (1991: 27) did suggest an alternative to workplace assessment in 'far more extensive and imaginative practical work, project work or other forms of simulation, in college and training centres'.

Rauen (in Rush et al, 2010: 468) defined simulation, for the purpose of teaching and assessment of occupational skills and knowledge, as 'an event or situation that is made to resemble clinical practice as closely as possible'. This definition of simulation reflects Jessup's (1991: 49) description of the conditions for their use in NVQs where 'performance must be demonstrated and assessed under conditions as close as possible to those under which it would normally be practiced'.

The research undertaken by Rush et al (2010: 468) concluded that simulations could provide a safe, realistic environment to learn 'where mistakes can be made without loss of life or expensive equipment'. Such conclusions may help us to understand why similar simulation assessment methods have been adopted for plumbing. However, Rush et al's (2010) conclusions are open to question, particularly in their application to plumbing, given that they were established in a study of nursing (something that might be considered as considerably different from plumbing).

'Low-fidelity' and 'high-fidelity' approaches to simulation were identified by Rush et al (2010: 469). Fidelity relates to 'the extent to which simulation mirrors the reality of practice' (Rush et al, 2010: 469). In regard to the practical aspects of plumbing, some simulations may be described as low-fidelity because they are less faithful to the physical skill requirements necessary to perform in the actual

plumbing job (Rush et al, 2010). These may include computer simulations, which do not allow for the human interactions found in other forms of high-fidelity simulated activities, which include high-level technology, realistic modelling or role play in client relationships. Such high-fidelity simulations would be required for the plumbing occupation, which replicate the pressure of the workplace activities and the productive nature of work. However, these types of high-fidelity simulations were missing from the aspects of assessments witnessed in the three colleges. Questions could, therefore, be raised about the need to develop more high-fidelity assessments in plumbing education programmes and courses.

Questions could also be raised about the tutors' perceptions of the fidelity of these simulated assessments and the impact that might have on the students' later work. A study in the Netherlands by Gulikers et al (2008: 401) examined whether 'students and teachers differed in their perceptions of the authenticity of various assessment characteristics'. These researchers reported that the teachers often thought that their assessment practices were more authentic than they actually were, which was found to differ from the students' point of view. In regard to my study, such discrepancies in the perceptions of plumbing- and gas-related assessment authenticity could be argued to put full-time plumbing students at risk. This is because a lack of authenticity or fidelity to the real situation at work may mean that students do not have an accurate or complete picture of what professional practice entails. Consequently, when students go on to enter the field of work, they might experience a reality shock, because this world is completely different from what they expected while studying in college (Pena in Gulikers et al, 2008: 410).

The reality shock exemplifies the risks involved with the low-fidelity, simulated nature of the college context in failing to prepare students for the unexpected nature of work, which Jessup (1991: 33) described as 'a crucial part of the concept of competence' he was trying to foster. The low-fidelity college simulations in this study risk undermining the concept of skills and knowledge transfer, which is assumed for preparatory types of college training in plumbing. Jessup (1991: 122) suggested that NVQ assessments make 'assumptions about skill transfer, in order to decide what inferences to draw about



performance in other contexts, from evidence of competence presented in the first context'. Jessup (1991: 122) asserted that the 'one factor which would seem significant to skill transfer is the variation in performance required between contexts'. However, he warned that if 'variations between contexts resulted in significant variation in performance requirements then transfer would not be a straight forward matter' (Jessup, 1991: 122).

It is important to note, in regard to plumbing training, that both low-fidelity and high-fidelity types of simulated training in the first context (college) can be inadequate if there is a significant variation in performance requirements in the second context (work). High-fidelity simulations offer the most authentic way of training for occupations in college contexts. However, teachers in this study described plumbing in a similar way to Crawford (2009: 81-82) talking about his vehicle mechanics: 'because the things they fix are not of their own making, and are therefore never known in a comprehensive or absolute way'. Therefore, variations in performance requirements are part of the everyday work process for plumbers because there is always something unknown. The occupation of plumbing was described earlier in this thesis (sections 5.6 and 6.12) as laden with problem-solving tasks in the workplace, which many tutors and students perceived as difficult to replicate in college contexts. Keep and Payne (2004: 58) agreed with this and were sceptical about the possibility of teaching generic problem-solving skills in colleges. Therefore, as well as asking questions about high- and low-fidelity simulations, we might also pose questions about how students can be prepared through their assessments to deal with the uncertainty that might arise in the workplace.

The concepts of 'low-road and high-road knowledge and skills transfer' (in Rush et al, 2010: 471), formulated by Perkins and Salomon, are helpful at this point. Perkins and Salomon presented an example of low-road transfer occurring in the case of a car driver renting a small van. Even though there is a slight difference in the driving task, a similar and previously-learned driving response is evoked and driving the van becomes almost automatic to the car driver. Therefore, low-road transfer between contexts still requires a high-fidelity experience or simulation in the first instance. However, where variations in performance requirements exist between contexts, high-road transfer is

required and this 'depends on deliberate abstraction from contexts of previous learning or application with a deliberate search for connections' (Perkins and Salomon in Rush et al, 2010: 471), requiring mental effort on the part of the learner.

If the prior college training was limited to low-fidelity simulations, this may constitute the students' prior learning experience, which does not mirror the normal conditions of the workplace. This situation is likely for full-time plumbing students who were unemployed or who had no relevant work experience or for apprentices learning new skills, which were not regularly practised at work. It was apparent in my study that many apprentices were undertaking safety-specific gas training in college that was not often relevant to what the students were doing in the work context. It was reported in chapter 5 that some apprentices were not working on domestic gas installations, such as those in domestic 'wet' plumbing maintenance and those working in the commercial plumbing sector. Moreover, at least one employed adult student and one unemployed adult student in my study were undertaking in-depth gas training at NVQ3 level without corresponding opportunities at the time to apply or practise this knowledge in the workplace. Grugulis (in Greatorex and Shannon, 2003: 7) also found that students spent 'a great deal of time collecting evidence and undertaking tasks for their NVQ which were not really part of their job'.

Hence, it could be argued that students' and apprentices' learning through simulations in college may have diminished opportunities for future recall on previous learning. It is important to note Dewey's (1938: 77) assertion that one's thought 'can expand into the future only as it is also enlarged to take in the past'. Moreover, Lave and Wenger (1991: 34) argued that the generality of knowledge required the students' power to 'renegotiate the meaning of the past and future in constructing the meaning of present circumstances'. Therefore, low-fidelity college experiences identified in this study may be deficient in providing the depth of knowledge, understanding and experience that is often required to deal with novel problems at work in the future, where variations in performance requirements exist. Keep and Payne (2004: 58) explained that while it was reasonable to claim that some aspects of vocational training policy may accommodate simplistic forms of problem-solving or analytical reasoning,

‘it would be unwise to assume that we could simply transfer this ability to the problems presented by a broken-down car’.

The limitations of simulations are an important aspect of this study because occupational competence is now conferred for plumbing and gas installation in college contexts, often without the need for relevant, corresponding and sustained types of work experience at the time of the training in college. The following comments are taken from the Gas Competence Review (2012: 36) concerning the nationally accredited certification scheme for individual gas fitting operatives, the Accredited Certification Scheme (ACS), in relation to wider industry concerns about college-based gas training:

*...I find it disheartening that competence is bought when taking the ACS qualification. How many people fail? New trainees coming into the industry are allowed to gain their ACS without the necessary experience and knowledge. (Survey – East Midlands, domestic businesses)*

*Twenty-week gas courses offered by many ACS centres are diluting the industry with engineers with little or no practical experience most of whom go on to set up their own businesses giving the industry a bad reputation. (Survey – West Midlands, service engineer)*

The ACS gas training and assessment-type module was an inherent part of the domestic plumbing NVQ3 taken by the group at C2 observed in this study. The findings reported in chapter four reflect some of the wider industry concerns voiced in the examples taken from the Gas Competence Review (2012) in that students were undertaking gas training without experience or gas-related training in the workplace. It was stated in the Gas Competence Review (2012: 6) that ‘many respondents noted that experience was a central part of competence’, however this does not seem to have been sufficiently recognised in the NVQ qualification processes associated with plumbing apprenticeships.

The findings in this chapter suggest that there appears to be a misplaced confidence by institutional stakeholders in the fidelity of college simulations and their ability to provide credible types of preparatory training and assessment for

those often working unsupervised in the plumbing and gas sector. Such findings reflect the concern and caution in competence-based learning expressed in the Dutch study by Gulikers et al (2008), who suggested in their findings that there was still a big gap between learning and assessment and working. This was echoed by Wolf (2011: 33) who emphasised the importance of apprenticeship learning over college-based, full-time courses in that 'a genuine workplace teaches both general and specific work-skills more effectively than any education-based simulation can, however hard it tries'. These comments support the reasons why Jessup (1991: 27) emphasised 'the need for work experience to be a valid component of most training', which now seems to stand in opposition to the current emphasis on college training and assessment simulations presented in this study of plumbing training.

As the data in this chapter have demonstrated, however, the assessments in the workplace context were also not straightforward. Despite their recognised importance, tutors and students still felt that there were ways in which these could improve. This finding reflects Brockmann's (2010: 71) critical view of the current structure of vocational learning in England, which 'neglects educational development and learning while stressing assessment of narrowly defined tasks'. The tasks that students undertook for their NVQ on-site assessment in my study were found to be rather narrow and associated with one off-type performance activities rather than the monitoring of their occupational development over time. Other than students collecting snippets of performance evidence in a job portfolio, the conferral of occupational competence seemed to be judged by a minimum of two visits to site by an NVQ assessor.

James (in Young 2006: 266) explained a key issue in relation to the notion of qualification, which is helpful to this discussion:

*The identification of a worker as either competent or not (yet) competent (the basis on which an NVQ is awarded or withheld), does not do justice to the depth and breadth of knowledge and skill that is constructed in the workplace...Qualifications are not skills themselves but a proxy for skill and it is debatable as to the skills that are being qualified in an NVQ.*

The current qualification outcome of the plumbing apprenticeship process, taking around four years for some students in this study, is the proxy for skill in the form of an NVQ3. However, in this study it was identified that the proxy for skill could be assessed and the NVQ could be attained by unapprenticed, adult students who capitalised upon the relatively minimal NVQ assessment requirements, which did not do 'justice to the depth and breadth of knowledge and skill that is constructed in the workplace' (James in Young, 2011: 266). Self-employed, full-time adult students could get the NVQ by meeting minimal performance criteria that did not require sustained workplace experience or qualified supervision. It was reported in chapter four that this situation seemed to be funding-driven and colleges were generally positive in promoting plumbing courses leading to self-employment. This created a dilemma for some tutors, who wanted to maintain industry standards, but were also subject to being employed and had little choice in the matter.

However, it seems that this legitimate but untrustworthy assessment process conducted by colleges and training centres is set to continue because it is not perceived as problematic in the current milieu. Although the Richard Review (2012) challenged some of the deficiencies in current qualification approaches associated with apprenticeships, its position on assessment and testing seems to perpetuate the existing processes described in this study, which were opposed by Wolf (2011). Richard (2012: 8) recommends an overarching end test, focussing on the proxy for skill and ignoring the vested interests of SSCs and awarding bodies, the limitations of college simulations and the importance of the apprentices' experience and development in the workplace over time:

*...there needs to be a test that demonstrates that the apprentice can take the knowledge and expertise they have gained and apply it in a real world context to a new, novel problem. The final test and validation must be holistic, in that it seeks to test the full breadth of the relevant competencies not merely the incremental progression of the apprentice. That may take the form of a project or an assessment in front of an examiner. It should be performance and real world based, rather than just theoretical. It should be primarily at the end of an apprenticeship, not measuring progress during it.*

It should be noted that Richard (2012: 8) preferred to use such terms as 'real world context' and 'real world based' over 'in the work place' to avoid stating that the tests would be simulated and located in college contexts. The findings in my study reveal the problems associated with the degree of fidelity in simulations and the issues concerning knowledge transfer which challenge Richard's (2012) end test proposal, when ordinary apprenticeship and time-serving would probably suffice. Indeed, it was stated in the Richard Review (2012: 32) that 'someone already doing the job for a significant period of time, should, by definition, already be at the standard required to do the job'. Therefore, the apprentices in this study, taking up to four years to qualify, would be up to the standard without the need to demonstrate their competence through an end test. Such an end test creates a proxy for skill, diminishing the status and experience of apprentices while providing equivalent status to the unapprenticed who are taking less challenging and less time-consuming routes into the occupation of plumbing. While there is growth in the number of unapprenticed students becoming self-employed, opportunities for apprentices in securing future employment, arguably diminishes. This seems to oppose the tacit settlement agreement in plumbing apprenticeships, where a young person works for relatively low wages for up to four years and, in return, there is the implicit promise of employment at the end (Snell, 1996; BIS, 2011).

### **7.9.1 Comment on the policy context**

The findings of my study support the comments of Wolf (2011: 90), who stated that 'unfortunately, the current system not only creates strong incentives for schools and colleges to steer students onto courses they can easily pass', but 'it also creates strong incentives for awarding bodies to make passing easy'. The Ofsted (2012: 15) evaluative report 'ensuring quality in apprenticeships' found that '39% of apprentices got assessment evidence for the NVQ element of their apprenticeship from a mixture of off-the-job and workplace learning'. This was perceived by Ofsted (2012) as the ideal scenario in delivering a good apprenticeship programme. However, they (Ofsted, 2012: 15) did not specify any particular ratio of evidence required for collection of evidence for the NVQ between off-the-job and workplace locations. For example, college evidence

may represent 98% and workplace evidence, 2%, and this would still be deemed an 'ideal scenario' and 'good practice' by Ofsted (2012: 15).

Although the plumbing NVQ observed in this study contained a mixture of off-the-job and workplace evidence, the combined technical certificate and NVQ qualification criteria overwhelmingly consisted of college-based evidence with work evidence comprising as little as two on-site visits. Wolf (2011) reported that quality control for vocational awards presents special challenges because of the use of substantial amounts of on-site assessment. However, she (Wolf, 2011: 94) reported that 'the alternative is to reward people for writing about doing something as opposed to actually doing it', meaning that teachers do most of the assessment instead of employers or senior employees. Reflecting Wolf's (2011) findings and those of this study, Ofsted (2012: 15) reported a significant minority of 'just under a fifth (18%) got their evidence *only* from the off-the-job centre; with the risk that insufficient account was taken of their performance in the workplace' (my emphasis). While Ofsted (2012: 15-16) recorded some 'good practice' in relation to the organisation and systematic verification of NVQ assessments, they also recorded 'poor practice', reflecting the findings in my study of insufficient observation of workplace activities and too much reliance on documentary evidence such as witness testimonies.

The number of successful apprenticeship completions was considered a characteristic of quality according to the Labour government's apprenticeship policies 1997-2010 (DIUS/DCSF, 2008; LSC, 2009). Although the findings in this study suggest that policy aims were being met in terms of student completions because few candidates failed the tests, many tutors were extremely uncomfortable with the onus on funding, linked to retention and achievement targets. Wolf (2011: 112) challenged the appropriateness of such approaches to vocational training stating, 'if awards are to be used for national performance monitoring, it is vitally important that there be very strong safeguards against downward pressure on standards'. It was suggested by Wolf (2011: 112) that qualifications 'should make serious demands of students, develop and accredit distinctive skills and attainments, facilitate progression post-16 and incorporate *clearly established, and properly monitored, national standards*' (emphasis in original). In order to achieve this, Wolf (2011: 112)

demanded that qualifications 'must have a strong element of external assessment' and this '*need not, and indeed should not, mean assessment entirely on the basis of examinations*, which in the case of vocational awards will often be quite inappropriate' (emphasis in original).

The final chapter of this thesis will draw all of the threads of these data discussions together in order to present some final conclusions and implications for practice.



## 8 Conclusions and implications

### 8.1 Introduction

The introductory chapter of this thesis described my experiences and concerns as a plumber and plumbing teacher, which had led to the undertaking of this study. The literature review in chapter two identified a gap in terms of the absence of studies in England on plumbing training and plumbing students' learning in college and work contexts. A need for this type of research was identified by James and Biesta (2007: 7), who reported that 'English FE was chronically under-researched'. Moreover, Richardson (2007: 385) identified the fact that 'accounts of the development of college education are notably absent', 'poorly documented' and lacking in pedagogical research, particularly in regard to narratives from the FE college sector. Chapter three described the methodological approaches I took in order to address particular aspects of this shortfall in educational research. I identified the following overarching research questions:

What are tutors' and students' perceptions and experiences of full-time college courses and apprenticeships in plumbing? What changes, if any, need to be made in order to improve the quality of training for the plumbing profession?

In order to tackle these questions, I formulated a number of research sub-questions, which helped with the collection of data in regard to tutors' and students' perceptions of teaching, learning and assessment and the linking of theory and practice. I also sought to understand tutors' and students' experiences and perceptions of the role of work experience in apprenticeship teaching and learning. The data collected from these investigations were thematically analysed and the findings set out in chapters four, five, six and seven. Each of these chapters included a discussion of the findings in relation to the relevant literature. From the discussions in the findings chapters, three key themes emerged. These key themes are linked to numerous underpinning

themes related to plumbing students' motivation and learning on plumbing courses and apprenticeships. The key themes centre on the importance of:

- A clear and coherent relationship between theory and practice
- Supervised work experience
- Authentic assessment

Although these findings may appear to be common sense in relation to apprenticeships and vocational training, they were found to be largely inconspicuous, assumed or taken for granted within plumbing training and qualifications. The following section presents these key findings. In section 8.3, I present some reflections on the way in which government policy in relation to vocational education and training may have informed and shaped the perceptions and experiences of the participants in my study. Potential implications for policy and practice are discussed in section 8.4.

## **8.2 Key findings of the research**

### **8.2.1 The importance of a clear and coherent relationship between theory and practice**

There was strong evidence of a dislocation between the theory and practical aspects of the curriculum, both within the college setting for full-time students and between the workplace and college settings for apprentices. These findings contradict the recommendations of some previous studies and theoretical literature in the field. The literature places an emphasis on integrating elements of theory and practice and advocates pedagogical strategies to help students construct conceptual links and embody their theoretical learning in performance activities (Jessup, 1991; Biemans et al, 2009; Monks, 2010; Guile, 2011). In this study, there was evidence that attention to the need for continuity and coherence between theory and practice had been subjugated to the desire for more flexible and inclusive vocational training systems, partly to meet wider socio-economic demands. While such flexibilities might mean that plumbing students can learn both knowledge and practice at different times and places, a disadvantage identified by this study is that many students are unlikely to

understand their interplay (at least until they gain further practical experience once they have qualified). The dislocations of contexts and discontinuities in curriculum, discussed in chapters five and six, had implications for teaching in that insufficient links were being made by tutors between theory and practice. This had an impact on the quality of both full-time students' and apprentices' learning and also affected learners' levels of motivation.

The distinct lack of coherence found in this study between college and work within the plumbing curriculum coupled with the findings of the exploratory pilot study supports Rainbird's (2006: 129) assertion that despite the formation of SSCs, 'there was little support for the development of cooperative relationships at different levels to support curriculum development and innovation' in the design of vocational qualifications. Although Ofsted (2012: 12) presented some evidence that off-the-job apprenticeship learning 'was structured well', it failed to provide details about the specific features of apprenticeships that they had viewed positively in regard to the organisation of the curriculum. All the colleges in this study appeared to organise curriculum, training and assessment to suit their own interests and for their own convenience, and this may be due, in part, to the way courses were funded in relation to qualification completion rates. In other words, the importance of passing the test took precedence over providing students with sufficient opportunities to understand and make effective links between different aspects of the curriculum.

There were also issues relating to health and safety. Apprenticed and unapprenticed plumbing students were required to work on electric, gas and combustion appliances, but many did not have opportunities to practise their knowledge under qualified supervision in the workplace. Apprentices were perceived by tutors as the most advantaged group because the workplace offered opportunities to gain further practical experience and facilitated a deeper understanding of the relationship of theory to practice. Full-time unemployed or self-employed students were believed to be at a disadvantage. There were too few links between theory and practical work. Some tutors reported a lack of sufficient materials and equipment for practical workshops and simulations were considered to be limited in providing the students with real-world experiences.

The theory curriculum was often delivered in a way that was assessment-driven, and pedagogical strategies appeared often to be constricted by tutors' lacking utilisation of teaching theories. The majority of the tutors in this study seemed to hold little regard for what have been identified, in other empirical research and reports, as characteristics of effective teaching (e.g. Guile, 2011; Lucas, Spencer and Claxton, 2012). Tutors reported that much of what was taught in teacher training had little relevance to their own subject area and teaching context. In addition, teachers also reported they were under considerable institutional pressure to ensure students' success in tests. Pedagogical approaches were often didactic and students had little scope to discuss their experiences in the workplace as part of the college curriculum. It could also be argued that an opportunity was therefore missed for peer interactions to take place, which might have raised full-time students' awareness and understanding of 'real world' jobs.

Despite these omissions in the curriculum and the reported pedagogical constraints, there were several demonstrations of integrated and meaningful teaching practice observed in this study. One example involved the utilisation of an interactive whiteboard in the workshop space for theory teaching, followed by opportunities for students to practise what they had learnt immediately and thereby consolidate their learning through relevant activities. The theory and practice learning was mediated by the tutor, with students working in pairs and small groups to achieve the learning objectives. The success of such pedagogical strategies linked the findings in my study to those reported in Guile (2011).

The findings of this study also suggest the need for colleges to place greater emphasis on ensuring that those who teach theory also teach the sessions in which related practice is undertaken. Such an approach encourages the utilisation of high-fidelity simulations to their greatest effect because tutors can refer back in the workshop sessions to the theory that they have personally delivered in the classroom and thus consolidate the students' learning and understanding. This would be particularly important for those full-time students and apprentices who do not have access to corresponding experiences at work (Rush et al, 2010; Guile 2011).

However, the Coalition government's (BIS, 2012b) revocation of the (2007a; 2007b) CPD and teachers' qualification regulations appears to be a backward step because it means there is currently no requirement for plumbing tutors working in FE to either possess or obtain formal teaching qualifications in order to teach in the VET sector. Teacher training and CPD offered tutors in FE a space for reflective and reflexive deliberation and contemplation in regard to their teaching practice. Moreover, teacher training allows teachers time away from everyday concerns to interact with other practitioners to share ideas and to consider and plan pedagogy and pastoral matters, which lie outside of their technical concerns. Therefore, removing the need for teacher training must have implications for the quality and effectiveness of vocational teaching which stands to compound the lack of diversity in teaching reported in the findings of this study. Challenging this position, the findings strongly suggest the need for teaching-related CPD and a more integrated involvement of relevant teaching theory rather than educational policy, which supports its diminishment in practice.

### **8.2.2 The importance of supervised work experience**

Supervised work experience emerged as a crucial element in the education and training of plumbers in this study. It not only, as discussed above, helped the apprentices to understand and apply theory taught in college, it also acted as a strong motivating force in terms of their enthusiasm for and commitment to learning. They enjoyed the real-world experience and most of the apprentices in my study showed more motivation in the workplace than in the college setting. In identifying preferences for learning at work or hands-on practical situations, these findings reflected those of other studies investigating apprentices and vocational students (e.g. Tanggaard, 2007; Brockmann, 2010; Monks, 2010).

In terms of the working relationships developed with colleagues and mentors in the workplace, my study provided evidence of the ways in which these were highly valued by adult students and apprentices. It must also be noted that students spoke positively about their college experience and their tutors. Nevertheless, the apprentices in my study were more inclined to take on the

characteristics of their co-workers' identities in the work context by assimilating their behaviour in working to high standards and being productive. Indeed, co-workers were described by the majority of students as responsive in helping them to learn at work. Some described their co-workers as friends and others showed respect for those they had learned from in the field. Apprentices sometimes made mistakes and they learned from this process safely, while being continually supervised and advised by co-workers.

Apprentices were clearly being 'scaffolded' in their learning. This helped them to deal with unexpected plumbing problems, which were part of the ongoing reality of the workplace (Vygotsky, 1978; Bruner in Hewitt, 2010: 111). Apprentices were guided in taking supported risks in their work, learning as they developed knowledge and competence in dealing with increasingly difficult tasks over the long duration of their training period. Although the literature suggests that the introduction of NVQs brought an end to time-serving in apprenticeships, there was clear evidence that apprentices in my study were learning at work over periods of up to four years, which meant they could be deemed to be time-serving (Field, 1995; Gospel, 1998; Young 2011). Through time-serving, apprentices practised and embodied their skills and knowledge through situated activities in the context of the workplace over a period of years. Furthermore, apprentices in this study were observed working to the standards expected of them by their co-workers, customers/clients and external inspection bodies. The findings in this study suggest that apprentices' time-serving experiences in the workplace could not be fast-tracked, learned or replicated as effectively elsewhere (Lave and Wenger, 1991).

Considerable emphasis was placed by the Labour government on work-related learning, particularly within the 14-19 curriculum. It defined WRL as "Planned activity that uses the context of work to develop knowledge, skills and understanding useful in work, including learning through the experience of work, learning about work and working practices, and learning the skills for work" (DCSF, 2009: 6). When the Diploma was introduced in 2008 (subsequently withdrawn by the Coalition government), it was made mandatory for each Diploma student to undertake two weeks' work experience. The original intention had been that this would be in a workplace setting related to the

subject area of the Diploma (intended to be in fourteen sector-related areas). However, as had often been the case with Key Stage 4 (pupils aged 14-16) work experience placements in general, the quality of the experience was sometimes poor and often not directly related to the students' programme(s) of study. The uneven quality of work experience generally was also highlighted in the Wolf Review (2011) of vocational education and training. In an attempt to address this situation, the Coalition government responded to the Wolf Review by highlighting the importance not only of work experience to vocational learning but also of genuine work experience, stating:

*We need to ensure that all young people are able to gain real experience and knowledge of the workplace. Genuine work experience is an important part of a student's programme of study while remaining in education, and we are committed to supporting schools and colleges in achieving this aim (DfE, 2011: 11).*

Despite this, however, both the Richard Review's (2012) and the BIS's (2014) 'Guidance for Trailblazers' were vague in regard to the specific need for workplace experience. As mentioned above, Richard (2012: 8) avoided using the term 'workplace' for his end test proposals. The BIS (2014: 24) guidance stated, 'a new entrant to the occupation will require at least one year of training to meet the standard'. Like Richard's (2012) comments, this could be interpreted to mean that all training and assessment could take place in a simulated college environment. Thus, there seems to be some ambiguity surrounding a key aspect of the apprenticeship standard in relation to the specific need for genuine work experience under qualified supervision. In this study, supervised work experience emerged as a crucial element in the education and training of plumbers and consequently as far too important to be left to interpretation in any quality apprenticeship standard.

### **8.2.3 The importance of authentic assessments**

The findings of this study raise serious questions concerning the competence of the assessment methods for testing students' knowledge and skills in both college and workplace contexts. The consequences of using multiple-choice

test instruments for external subject knowledge assessments seemed to reward short-term goals and to lead to surface learning, which was more akin to 'meeting requirements' than to deepening students' learning (Ecclestone, 2002: 167; Ofsted, 2012). Chapter seven described the purpose of the theory lessons in this study as being aimed at preparing students for the test rather than helping their understanding of the practical aspects of the course. In addition, a situation existed where it was very difficult for students to actually fail a theoretical assessment because they were able to keep re-sitting the test until they passed. The institutional ethos around testing was described as 'unforgivable' (tutor Gordon C3) because of the pressures on teachers to ensure 100% achievement. The findings in this study support Young's (2011) position in that few tutors in my study had faith in the assessment procedures and methods, which they considered to be detrimental to the quality of learning and to trust in the qualification.

It was suggested in Chapter seven that, for practical training and assessment, the reported low-fidelity simulations in college could not adequately replicate the experience of doing the job in the real world, with all its inherent risks and uncertainties (Rush et al, 2010). This was particularly true in the case of plumbing. Despite many adult students benefiting from the flexibility of plumbing courses and opportunities for self-employment, the findings in my study correspond with the concerns of Unite (2012: 10), who suggested that college-based courses could create 'under-qualified individuals, who have the misconception that they are then able to undertake safety critical work'. The lack of authenticity or fidelity in assessments for occupational competence in plumbing and gas could be argued to put full-time plumbing students at risk because they may not have an accurate or complete picture of what professional practice entails. Consequently, when students eventually enter the field of work, they might experience a 'reality shock', because it is a world that is completely different from what they had expected while studying in college (Pena in Gulikers et al, 2008: 410).

The reality shock exemplifies the risks involved with the low-fidelity, simulated nature of the college context in failing to prepare students for the unexpected nature of work, which Jessup (1991: 33) described as 'a crucial part of the



concept of competence' he was trying to foster. Low-fidelity college simulations run the risk of undermining the concept of skills and knowledge transfer for some plumbing activities. It was taken for granted that knowledge and skills learned by students on preparatory courses in the college context could be transferred to similar situations in other contexts. However, Jessup (1991: 122) warned that if variations between contexts resulted in significant variation in performance requirements, then transfer of knowledge and skills was not a straightforward matter. It was argued in chapter seven that learning through low-fidelity simulations in college may diminish students' opportunities for future recall on previous learning. It is also important to note Dewey's (1938: 77) assertion that one's thought, 'can expand into the future only as it is also enlarged to take in the past'. Therefore, low-fidelity college experiences may be deficient in providing the depth of knowledge, understanding and experience that is often required for high-road transfer in dealing with novel problems at work in the future, where variations in performance requirements exist (Perkins and Salomon in Rush et al, 2010). Such findings reflect the concern and caution in competence-based learning expressed by Gulikers et al (2008), who suggested in their findings that there was still a big gap between learning and assessment, on the one hand, and working, on the other. This was echoed by Wolf (2011: 33), who emphasised the importance and effectiveness of apprenticeship learning in a 'genuine workplace' over 'any education-based simulation'.

However, my study also found evidence that the assessments in the workplace context were not straightforward. Despite their recognised importance, tutors and students still felt that there were ways in which these could be improved. The current qualification outcome of the plumbing apprenticeship process, taking around four years for some students in this study, is the proxy for skill in the form of an NVQ3. This qualification does not do 'justice to the depth and breadth of knowledge and skill that is constructed in the workplace' (James in Young, 2011: 266). The value of time-serving and the importance of working relationships, identified as being of key importance to the concept of apprenticeship in this study, were inconspicuous within the NVQ. As a consequence, self-employed full-time adult students could achieve the NVQ by meeting minimal performance criteria or the proxy for skill, which did not require

sustained workplace experience or qualified supervision and which was perceived by tutors and students as the most important requirement for becoming a competent plumber.

Such proxy for skill in end tests arguably reduces the status and experience of apprentices while, at the same time, providing equivalent status to the unapprenticed who were taking less challenging and less time-consuming routes into the occupation of plumbing (James in Young, 2011). Moreover, while there is significant growth in the number of unapprenticed students becoming self-employed, which many tutors reported as a successful aspect of the further education system, opportunities for apprentices to secure future employment is arguably diminishing. This seems to oppose the tacit settlement agreement in plumbing apprenticeships, where a young person works for low wages for up to four years and, in return, there is the implicit promise of employment at the end (Snell, 1996).

### **8.3 Some reflections on the policy context**

Rainbird (2006) argued that a key problem with the Labour government's (1997-2010) centralised approach, where the state was the main provider of funding for training, was that other parties had little influence over training policy. According to Rainbird (2006: 129), the government's stance 'in the supply side of the labour market' was shaped by their concerns about the economy (e.g. shortages in skills required for increased productivity in global markets) and social inclusion (e.g. widening access to education and training) (Leitch, 2006; DIUS/DCSF, 2008). Labour's policy solution to these economic and social concerns was to focus on the development of vocational qualifications and apprenticeships. Young people who were disenchanted with the academic curriculum were provided with increased flexibility in vocational pathways from the age of 14. Examples include the introduction of the Increased Flexibility Programme for 14-16 year olds in 2001, Applied GCSEs in 2004 and sector-related Diplomas in 2008. The raising of the participation age to 17 by 2013 and to 18 by 2015 was a longer-term strategy for improving outcomes for 16-18 year olds (DCSF in Hodgson and Spours, 2011a: 2). For families unable to support their children financially into full-time education and/or training post-16, the

Education and Maintenance Allowance for 16-19 year olds was introduced (although this was later withdrawn by the incoming Coalition government). With growing problems of youth unemployment and NEETs during a period of extended recession, a new discourse of 'employability' emerged under Labour, concerned with a focus on the types of full-time and flexible vocational provision in FE highlighted in this study:

*We need to do still more to attract increasing numbers of young people to learning, transform standards in the basics and in the wider skills for employability, and enable all young people to be taking qualifications that have a real standing with employers and the public at large, establishing a strong progression route to Further and Higher Education... so that all young people have the right skills to meet the demands of a rapidly changing world and can continue learning throughout life (Ed Balls [former Secretary of State] cited in DIUS/DCSF, 2008: 1)*

However, the Conservative party had questioned the quality of current vocational qualifications for 14-19 year olds in opposition and once in government as part of the Coalition from May 2010, they commissioned Professor Alison Wolf to undertake a review of them. Wolf (DfE, 2011) claimed that many types of full-time vocational courses failed to offer routes to further/higher study and entry to employment for those still in education. The Coalition government (DfE 2011:1) acknowledged that whilst every young person should 'have the opportunity to take excellent technical and practical courses', 'the current system of vocational education is failing too many young people'. Their response to the Wolf Review was to accept all of its recommendations. One of her recommendations was to substantially reduce the number of vocational qualifications, which would attract performance points in league tables, to ensure that those remaining 'will be the very best for young people – in terms of their content, assessment and progression (DfE, 2011: 3).

The findings in this study support Wolf's (2011) conclusion that too few questions seem to have been asked in the past regarding the quality of vocational courses. This was particularly true in relation to the significant uptake in college-based qualifications in plumbing (see Table 1.1) and their impact on

young peoples' learning experiences (i.e. lacking access to corresponding work experience) and future employment prospects. Without a clear employment route open to them, the full-time younger students in this study were found to lack motivation. This was arguably exacerbated by the lack of links made between college theory and work practice in the teaching of the college curriculum. In this context, Hodgson and Spours (2011b: 4) raised the question of, 'what skills and knowledge young people need to provide them with the capacities and resilience to enter an unpredictable labour market and to cope with an uncertain future'. Seeking to address some of these issues in regard to full-time college courses and apprenticeships, the DfE (2011: 8) stated:

*We are committed to all 16-19 year olds having individually tailored programmes that enable them to fulfil their ambitions whether that is moving on to employment or further study. As part of this, the funding for 16-19 education needs to be radically changed to remove perverse incentives for colleges to accumulate qualifications rather than provide sensible, balanced and broad programmes of study. ... We want the vast majority of 14-16 year olds to be taught an academic core, which can then be supplemented by a vocational element.*

The DfE (2011: 3) specified the need for a broad curriculum rather than one with a specific occupational focus and an emphasis on younger students' attainment of 'English and mathematics, ideally to GCSE A\*-C, by the age of 19'. This academic core was also visible in the Skills Funding Agency (SFA) (2013:1) statement on apprenticeship quality, which includes higher expectations for English and maths within Apprenticeships. As part of BIS, the SFA were a successor organisation to the LSC in funding skills training for FE in England. However, the findings in this study suggest that such changes may present a significant barrier to engaging many younger and adult vocational students who struggled with English and maths, and who preferred practical modes of learning. Moreover, many students in this study were employed by members of their family. While the need for GCSE English and maths may not create a barrier to these students' employment prospects, it could result in some of them avoiding off-the-job training altogether. This may lead to growth in a 'restrictive' type of apprenticeship in family firms, which arguably directs socio-

economic development towards a low skills equilibrium. This is something consecutive governments have sought to avoid (Fuller and Unwin, 2003; Coffield, 2004; Rainbird, 2006).

Throughout Labour's governance, there was an emphasis on the benefits of partnership working, particularly between the education and employment sectors in relation to the development of work-related learning and qualifications (Haynes and Lynch, 2013). For example, SSCs had played a key role in the development of the 14-19 Diplomas in terms of curriculum content and assessment. The current Coalition government is also keen to involve employers in qualification and curriculum development. Following the Richard Review of Apprenticeships (2012), the Coalition set out their reform programme and implementation plan in 'The Future of Apprenticeships in England' (BIS 2013), stating that 'Employers need a credible voice in the design of qualifications, provided through SSCs' who should 'have a remit which focuses their work on the areas where they can add most value' (in DfE, 2011: 9). So, in what appears to be a restating of Labour policy, the Coalition has once again (BIS, 2013) put employers in the driving seat in the design of future Apprenticeship standards. It has also identified the need to ensure that not just large-scale employers are involved. In its Guidance for Trailblazers (BIS 2014; 4), the government stated that 'Our reforms are focused on putting employers in control of Apprenticeships in future, so employers will lead Trailblazers. It is important that the standards developed work for both larger and smaller businesses and so the Trailblazer projects will need to involve employers of different sizes, and consult with the wider sector as their standards near completion'. In addition, there is a renewed emphasis for an increased role of professional bodies within the 'Trailblazer' groups (BIS 2014). Wolf (2011: 63) had argued that while SSCs claimed to represent and articulate the view of employers, they were not trade or professional bodies but instead had been created and largely funded by government. The outcome of this was that 'employers, SSCs and providers tend to fulfil *minimum* requirements' (my emphasis) (Fuller and Unwin, 2011a: 38).

These new Trailblazers, comprising partnerships between small and medium sized enterprises, SSCs, professional bodies, training providers and

assessment experts (including awarding organisations), appear to be better placed to develop high quality, fit-for-purpose apprenticeships with authentic forms of assessment. However, the Trailblazer initiative does not address the issues identified in this study in relation to full-time courses in colleges, where there is a lack of workplace learning, and assessments are undertaken in simulated environments. The outcome of the Trailblazer initiative may in fact lead to a widening of the gap between the performance standards required of employed apprentices and those of unemployed or unapprenticed adult students who are undertaking the same qualifications and end tests as a means of entry into the sector.

A key issue that has emerged during this study is the potential lack of progression into the plumbing industry of students participating in this research. Consecutive governments have provided financial incentives to employers to aid growth in the provision of apprenticeship places in order to address youth unemployment issues. Under the Labour government, the DIUS/DCFS (2008: 38) stated, 'we believe that there is scope for moderate growth in Apprenticeship numbers by offering similar direct payment incentives to large companies, so that they can recruit more Apprentices than they need'. Moreover, in a declining economy the Coalition government announced 'reforms to Apprenticeships that include at least 40,000 incentives for small businesses to take on a young apprentice' (HM Government, 2011: 2). In addition to addressing youth unemployment issues, Steedman, Gospel and Ryan (1998) described the economic benefits concerned with growth in apprenticeship numbers. They (Steedman, Gospel and Ryan, 1998) proposed that increasing the number of apprenticeships would contribute to the nation's stock of intermediate qualifications and, in turn, increase productivity, lowering youth unemployment and deflating craft wages to reduce the risk of macro inflation in the wider economy. In consequence, significant increases in the numbers of pre-apprenticeship students, adult students training for self-employment and apprentices in paid or unpaid employment were clearly visible and reported in the findings of this study. In adding to this supply-side discourse, migrant labour in the single European-wide labour market must also be counted as having the potential to reduce craft wage inflation. In sectors such as plumbing, 'well-

trained, well-educated workers from the accession states are readily available and keen to work in the UK' (Keep and James, 2011: 60).

Thus, the plumbing sector supply-side consisted of growth in both self-employment and apprenticeships, with employers and private customers also having the option to procure the services of highly qualified migrant workers. However, a consequence of such supply-side growth is that opportunities significantly diminish for apprentices to attain employment and better pay once they have qualified. In some instances, apprentices were even found to be working unpaid. Such a process stands to breach the 'implicit contract' in the traditional apprenticeship settlement:

*Paying a lower wage than for a fully qualified worker while a person receives training is a long-standing principle of traditional Apprenticeships. In the UK there is an implicit contract that the individual learner is making a contribution to their human capital that will pay future dividends in terms of better pay and employment prospects on completion of their training (BIS, 2011: 9).*

Such prospects of better pay were described in the introductory chapter as a key selling point for apprenticeships, with City & Guilds (2011: 1) touting the 'Rich List' to young people as 'the principle that vocational learning is a gateway to wealth regardless of a learner's background'. However, the findings in this study highlight the diminishing potential for apprentices to access the 'future dividends in terms of better pay and employment prospects', which was implicitly and explicitly promised in the marketing of apprenticeships (BIS, 2011; City & Guilds, 2011).

The findings of this study suggest that flexibilities in the education and training policies and the labour markets, coupled with growth in apprenticeships, unregulated self-employment and migrant labour may bring economic and social benefits, but they may also present longer-term problems for the sustainability of plumbing apprenticeships in England. Moreover, the issues highlighted in regard to the lack of authenticity in external types of college-based assessment serve to undermine the quality of vocational and

apprenticeship training. The findings also bring to light the health and safety risks associated with under-qualified individuals who have the misconception they are able to work with plumbing, heating, gas and electrics. This situation may also have a detrimental effect on the professional standing of the plumbing occupation in the eyes of the wider public.

## **8.4 Implications for policy and practice**

This section presents the implications of the research for policy and practice, describing what changes, if any, could be helpful in improving the quality of training for the plumbing profession.

### **8.4.1 Realistic expectations of what plumbing involves**

A key problem described in the introductory chapter, which was reflected in the findings in chapter four of this study, was the number of students entering the plumbing occupation via full-time college courses who did not have corresponding employment or reasonable hope of access to supervised work experience. Therefore, I would suggest:

- Comprehensive and accurate careers advice, information and guidance is required to ensure that young people and adult students are entering plumbing courses with realistic expectations of what these courses will offer and the likelihood of securing employment as a plumber on completion of such courses.

Chapter four discussed the widespread lack of work experience opportunities for full-time students either during, or on completion of, the preparatory plumbing courses. This was particularly the case for full-time, younger students aged 16 to 19, who were encouraged to seek apprenticeships or corresponding work experience in order to apply their learning or to link theory and practice between college and work. For adult students, self-employment was an option either during the full-time plumbing course or on completion of the course. However, the findings in my study suggest that adult students seeking self-employment may be putting themselves and the wider public at risk given the



limitations of the college curriculum in preparing students for working unsupervised in the occupation of plumbing. Although Brockmann, Clarke and Winch (2010) suggested group-based training schemes and sophisticated college simulations as strategies to address full-time students' need for occupational experience, these were found, in my study, to be problematic in regard to plumbing training.

Therefore, whilst the range of flexible training options observed in this study might be praised for the opportunities they offered in terms of catering for students from all walks of life and widening participation in education, questions may be raised as to how successful this actually was in achieving this. Indeed, from what the tutors said, there was little hope for many students of achieving a work placement either during the course, or on completion. This contrasts sharply with media reports of the stability associated with a job for life and of the wealth people could expect on entering the plumbing occupation. This was something that was even less assured for those who came from less privileged backgrounds — those who did not have the social capital to get ahead and gain an apprenticeship work placement. Therefore, colleges need to take more responsibility in regard to student work placements:

- Colleges need to consider providing full-time students with support to find relevant work experience placements to enable them: (a) to apply theory learned in the college setting to real work situations and (b) to make them more attractive to employers at the end of their course.

#### **8.4.2 Making clear links between theory and practice**

In light of the key findings in this study, the following implication for change in regard to the development of the curriculum and the organisation of plumbing qualifications and courses is relevant to policy makers, sector standard setting bodies like 'Trailblazers' (BIS, 2014), SSCs, employers and self-employed representative bodies, training providers, awarding bodies and colleges:

- The design and delivery of training must ensure that aspects of the curriculum in theory lessons are systematically linked to practical

lessons. It would also be desirable for college training to link directly with students' work activities.

In regard to the organisation of plumbing courses for employed adult students and apprentices, Biemans et al (2009) argued for connectivity between students' school assignments, workplace training tasks and competence-based assessments, creating continuity throughout their learning pathways. However, such connectivity between college and work learning, for the English plumbing curriculum, is difficult to achieve with the current prescribed and separate curriculum arrangement for theory and practice, which has been shown in my study to be often dislocated from what students are doing at work.

In addressing the issue of teacher support of students' learning in college, this study has reported several barriers to the continuity of theory and practice in curriculum, for both pedagogy and assessment. Moreover, the obstruction of continuity in teaching, learning and assessment included the use of different tutors and assessors, large class sizes, material restrictions and limitations in practical training facilities. Despite these issues, continuity in the theory and practice curriculum in this study was shown to be possible, which included the tutor making pedagogical links between theory and practice for gas-related training in the workshop space. This finding suggests that it is much more feasible for a tutor to teach theory and practice, with a group of students working on the same module at the same time in the same session. This compares with much of the current practice of different tutors trying to link different knowledge and practice, across different places, at different times.

However, it must be acknowledged that the teacher had meticulously devised and planned the teaching, resources and materials for a whole group of students for extended periods of participation and learning. Students worked on the same NVQ3 gas module together over several weeks, which contributed to peer-learning interactions. Furthermore, the student group was at NVQ3 level, which arguably had a higher proportion of motivated, reasonably mature and capable apprentices and adult students than, for example, a technical certificate level 2 group with unemployed 16- to 19-year-olds. Nevertheless, with smaller group sizes and adequate teaching resources and support as well as an

emphasis on peer-learning, it is highly possible that this integrated model of theory and practice in the same session/workshop could work well in other institutions.

The findings in this study support Guile (2011) and Biemans et al (2009) in emphasising how the organisation of curriculum has been taken for granted by those institutions involved with the design of plumbing qualifications in England, such as SSCs, training providers, awarding bodies and colleges. In particular, the tutors observed in my study faced multiple challenges in regard to dealing with a qualification system that had not been designed for the integration of theory and practice. Moreover, the tutors were charged with delivering fragmented qualifications to students' differing capabilities, motivations and varying levels of access to work experience.

However, it might be possible to (re)design a plumbing training curriculum at NVQ2 level to involve training modules that are common to most apprentices at the beginning of their training journey. These may include health and safety training and the basic plumbing practical skills required to do the job. Therefore, most training in the early stages at NVQ2 level could consist of mainly hands-on practical skills and learning, located in the college workshop. The findings of my study suggest that students' literacy and numeracy skills could be developed using written assignments, which could relate directly to apprentices' work activities rather than following a prescribed external curriculum (Biemans et al, 2009; Monks, 2010). A generic assignment template could be developed for key plumbing theory modules (e.g. cold water, hot water, sanitation, heating etc.) to help apprentices locate their own experiences at work within their written college projects. This approach would link apprentices' theoretical assignment learning in college either to their practical activities in the workshops and/or to their activities in the workplace.

However, it is clear this approach would have some limitations given that young students in my study were found to be lacking in motivation for theoretical types of learning. To overcome this problem, Biemans et al (2009) suggested a high degree of coaching for apprentices by way of external support and guidance, especially in the early stages of students' educational programmes. For this

type of approach, tutors would need to play a key role in fostering and stimulating students' self-responsibility and self-reflection to establish a sound basis for students' ongoing independent learning and qualification progression (Biemans et al, 2009). Once students were ready and able to self-manage their own learning, then more flexible options for education and training would be possible. A more flexible approach would bring greater relevance to students' learning and improve motivation, which is particularly important for safety-specific training at NVQ3 level (e.g. gas and electrics). However, it is important that students can align college training with corresponding opportunities under supervision at work, in order to apply and embody their knowledge in skilled activities (Guile 2011).

Aimed at self-motivated students working at NVQ3 level (or higher), one way of creating continuity between college theory and practice in relation to students' work learning would be to:

- Introduce options for different modes of college attendance, such as block release (over a period of weeks in college), day release or evening attendance, for particular college modules (e.g. cold water, gas training, central heating). This would help to align college modules directly to students' work activities, catering for students' and employers' immediate training needs.

Such a change would also improve the health and safety knowledge of students and apprentices at NVQ3 level, which is when they require competency training for gas and/or electrics at work, before the particular module is covered in the normal process of the curriculum in college. For example, apprentices working with electrics at work would benefit from prioritised types of safety training such as safe isolation procedure at the same time as they begin these types of activities. This challenge to the normal batching of groups of students at NVQ3 level brings greater relevance to training and teaching strategies, which may be devised for individuals who join other groups or for groups of students with the same training needs. In order to achieve this, teachers, workplace supervisors and students need to develop their responsibilities and competencies required

for continuity of the theory and practical curriculum, spanning college and work contexts (Gulikers et al, 2008; Biemans et al, 2009).

### **8.4.3 Changes in tutor strategies for teaching and assessment**

The findings in this study suggest that the Coalition government (BIS, 2012b) took a backward step in revoking Labour's (2007a; 2007b) regulations for teachers' CPD and teaching qualifications. This means there is currently no requirement for plumbing tutors working in FE to either possess or obtain formal teaching qualifications. With a view to helping tutors better understand their pedagogical predicaments in vocational education, in light of the findings in this study, it is suggested that:

- Tutors need to engage with formal educational training, which will enable them to understand the links between teaching and learning and teaching and assessment in order to become reflexive teaching practitioners. In order to help achieve this aim, the regulatory requirement for FE teachers to have formal teaching qualifications should be reinstated.

This study has demonstrated the difficulties that tutors faced in teaching plumbing apprentices. This was due, in particular, to the inflexibility of the teaching timetable, the large numbers of students in each class and the physical space of the classrooms or workshops. Moreover, the ethnographic snapshot data demonstrated the tutors' reluctance to recognise themselves as teaching professionals. The tutors were much happier to align themselves with the plumbing profession and to be seen as experts of their trade. Whilst this is understandable and fits with what a number of others have found in relation to the teaching of more vocational subjects (e.g. Robson, 1998; Gulikers et al, 2008; Biemans et al, 2009), it was sometimes problematic. It meant, for example, that these tutors had little access to knowledge about teaching and learning and related pedagogical strategies and also very little agency in changing their programmes.

This study has shown that this type of pedagogical knowledge may have to be introduced in ways that the tutors would find accessible and useful, given their already heavy workload and their resistance to engaging with further training in this area. This perhaps means that more in-house training for these FE lecturers would be of benefit and that this could and should be tailored to their particular needs (e.g. addressing the questions that they were raising in relation to theory and practice divides, working to motivate students, helping to raise numeracy and literacy levels, supporting students on practical placements). It is suggested that once this system of training and professional teaching development is established, it could become self-serving. In other words, it would not always have to involve only external educational experts, such as academic researchers who have access to contemporary empirical and theoretical knowledge in this respect. It could also include the tutors themselves, as they work to establish and promote best practice amongst themselves.

#### **8.4.4 High-fidelity training and assessment**

The discussion in chapter seven raised serious questions about the competence of the assessment methods for testing students' knowledge and skills, in both college and workplace contexts. In seeking to address this situation, the Coalition government's response to Wolf (in DfE, 2011: 5) called for vocational qualifications to 'have rigorous assessment, including a percentage of external assessment'. Moreover, the Government (in BIS, 2013: 3) agreed with Richard's (2012) scathing appraisal of current VET assessment regimes and approved of his far-reaching recommendations for change. Many tutors in this study were found to be critical assessment methods and they indicated a preference for written assignments and/or verbal questioning over multiple-choice questions as a means of testing students' plumbing knowledge. These findings in relation to the need for change in vocational qualifications are reflective of those called for by Wolf (in DfE, 2011) and by Richard (2012).

However, Richard's (2012) proposal for testing occupational competence through end-point assessments is challenged by the findings in this study. In regard to practical training and assessments, ongoing and informal types of

supervision and training at work emerged as valuable, and should be given greater acknowledgement in qualifications and awards. Furthermore, the practical simulations for training and assessment in college were found to be unfit for purpose because they were largely low-fidelity in nature (Rush et al, 2010). Therefore, in relation to SSCs' assessment strategies, CPSs, licensing bodies for plumbing, gas and electrical training, qualification and assessment bodies, training providers, colleges and any future plumbing sector 'Trailblazer group' (BIS, 2014), I would make the following suggestion:

- For plumbing education programmes and courses, there is a need to develop assessment processes and training that are high-fidelity and fit for purpose, replicating the workplace as closely as possible. This would first entail gathering stakeholder perceptions on whether college assessments are deemed as low-fidelity or high-fidelity in nature (Gulikers et al, 2008). Such classifications of aspects of the plumbing curriculum and assessment in college contexts may signify their limitations or potential for providing low-road and/or high-road skills and knowledge development and transfer (Rush et al, 2010).

Low-fidelity simulations had implications for apprentices' motivation and learning and, in particular, the levels of competence that full-time students' attained from full-time college courses. There are several reasons why high-fidelity simulations are important for the training and assessment of plumbing. For practical training, high-fidelity simulations provide opportunities for students to practise occupational skills in a safe environment and embody their theoretical learning in practical activities, while facilitated by tutors (Rush et al, 2010; Guile, 2011). Student interactions in high-fidelity simulations facilitate students' knowledge and skills transfer to similar situations in other contexts. Moreover, high-fidelity simulations may also provide experience and knowledge for students to draw on in solving future problems in other contexts where there are variations in performance requirements (Jessup, 1991; Rush et al, 2010).

In contrast, low-fidelity simulations can fail to prepare students sufficiently for the problems they will face in the reality of the work context. The findings in this study strongly indicated that tutors felt that the plumbing activities were not

authentic. Such discrepancies in the perceptions of authenticity surrounding plumbing and gas-related training and assessment, it could be argued, put full-time plumbing students at risk. This is because a lack of authenticity or fidelity to the real situation at work may mean that students are not sufficiently prepared for the challenges and unexpected events that professional practice entails (Gulikers et al, 2008). However, despite high-fidelity training and assessment being essential to occupational learning, the findings in chapters six and seven suggested that there were aspects of knowledge and competence that could only be learned in the workplace. This is discussed further in the next section.

#### **8.4.5 The importance of time-serving with qualified co-workers**

The importance of time-serving in the development of students' and apprentices' skills, knowledge and competence was found in this study to be a key characteristic of apprentices' learning and motivation. The findings in chapter seven indicated that apprentices were spending up to four years training in the workplace under the supervision of co-workers and mentors. Yet, the SFA (2013: 2) apprenticeship standards for those aged 16-18 specified a minimum apprenticeship duration of 'at least 12 months' and for those aged over 19, not less than 6 months. In light of the findings in this study, these are insufficient periods of training time for entry to safety-specific, skilled occupations, such as plumbing. The importance of sustained employment and long apprenticeships are reported more widely in the BSE sector by an employer body known as the Heating and Ventilating Contractors' Association (HVCA). They stated that 'apprentices are employed and make a valued contribution to that employer for the duration of their apprenticeship which is on average a minimum of four years' (HVCA in BIS, 2012a: 55).

The relationships that developed between apprentices and their co-workers were observed in this study as essential to apprentices' learning and their occupational identity in becoming plumbers. In addition, apprentices were guided, supported and mentored in the college context by plumbing teachers, assessors and support workers, who offered pastoral care to students. In order to thrive and learn, it was not enough that apprentices just time-served; they



also needed the supportive scaffolding given by others around them (Vygotsky, 1978; Bruner in Hewitt, 2010: 111). This scaffolding was essential in helping apprentices to identify with other workers in becoming qualified plumbers and working to industry standards. This finding from my study is reflected more widely in the plumbing sector by the CIPHE. In the CIPHE's (2012: 1) response to the Richard Review (2012), the CEO, Wellman, was quoted as saying 'he does not support the promotion of one-year apprenticeships within engineering disciplines, and instead believes that highly skilled apprenticeships over a period of three to four years are something the plumbing and heating industry requires...vocational qualifications are essential, but only when accompanied by practical experience and effective mentoring'.

Supervised and sustained periods of work experience were found in this study, and in wider industry, to be the bedrock of occupational competence. In order for apprentices to capitalise on their skills and knowledge attained through such time-serving, it is suggested that:

- Plumbing apprentices should be awarded journeyman status to formally recognise the three to four year period they time-serve at work, under qualified supervision.

Professional bodies such as the CIPHE already run their own voluntary certification system involving journeyman, engineering technician and master certification schemes, which are similar to this proposal. Nonetheless, other organisations associated with apprenticeships, such as student bodies, unions, trade associations and social partnerships, may recognise the value in participating in the development of a trusted award scheme to run alongside existing employer-led technical certificates and NVQs.

Such a journeyman award can also help new entrants in an occupational sector to clearly understand the limitations involved with undertaking college-based competency courses and NVQs, which may not emphasise the need for long periods of supervised work experience. It was found in this study that unapprenticed students could attain the NVQ by meeting relatively minimal

NVQ workplace assessment requirements, which was perceived by many experienced tutors as more of a risk to students than an opportunity. Indeed, the findings in this study suggest that NVQs failed to cover the depth and breadth of knowledge and skill that supervised apprentices were constructing in the workplace (James in Young, 2011).

Young (2011: 265) was critical that NVQs had come to 'replace the combination of "master craftsman judgement" and "time serving" associated with traditional apprenticeships'. However, despite this, my study has found evidence that the NVQs have not, in fact, replaced time-serving because time-serving still seems to exist in plumbing apprenticeships. Thus, rather than replacing time-serving, the introduction of the NVQs made the value of time-serving and the need for supervision of apprentices by qualified co-workers, inconspicuous. Therefore, a journeyman status as the outcome of apprenticeship simply reveals the hidden value of time-serving and the supervision of apprentices by experts.

However, in considering qualification inclusion, there are some limitations to the concept of journeyman proposed here. This is because many unapprenticed or full-time students following alternative routes into the occupation of plumbing often do not time-serve in the same way as apprentices. In addition, many unapprenticed students were reported as becoming self-employed and working alone without supervision by qualified workers. However, students following alternative routes into occupations such as plumbing are still eligible for employer-led NVQs. Moreover, it is not suggested that unapprenticed students should be excluded from attaining journeyman certificates. Nevertheless, it is proposed here that some form of additional professional mentoring would need to be implemented (via a recognised professional or trade body) for unapprenticed, self-employed, full-time students who wish to apply for journeyman status. In addition, in keeping with the requirement for apprentices, the unapprenticed students should be expected to time-serve for three to four years, working within the occupation of plumbing, before becoming eligible for journeyman status.

## 8.5 Research limitations and possibilities for future research

As a practising master plumber, plumbing teacher and a Fellow of a professional body, I began the research with a world view furnished with preconceptions of what I believed to constitute good practice and professionalism. These beliefs were informed by my life experiences, which had changed little over the decades of working in plumbing and in further education. In relation to this, Delamont (2005: 92) comments that 'perhaps we are all stuck with faith in the new paradigms of our early careers?'. The introductory section of this thesis communicates aspects of my occupational journey and motivation to engage with this study, which may be considered as being other than neutral. Such research journeys sometimes take 'the route of faith and pilgrimage' when they are designed and completed with interests 'that are close to our hearts' (Delamont 2005: 91). However, it must be noted that this study is not about the introspections of the researcher because the main focus is the analysis of social settings and the perceptions of tutors and students (Delamont, 2009: 58). Nevertheless, Delamont (2005: 92) warned that researchers who take pilgrimage routes to educational research 'are blighted by the familiarity problem', which requires further discussion in this section in relation to my research position and reflexivity in the research.

Early in the fieldwork, I realised that my understanding of what constituted a professional plumber was not in keeping with the general opinions of other tutors, students and workers, which caused a gradual shift in my own orthodoxies. I learned much from the tutors' reasoning and perspectives in this study, which helped to open my mind to their voices, positions and opinions. Bass et al (in La Boskey, 2005: 133) described 'reflexivity, wherein world views clash from the input of critical friends and theory, can push reflection past defensiveness into transformative learning'. There was a transformative affect on my Self as a teacher and plumber during the process of this study because I did not argue my opinions with participants; I only sought to listen. Consequently, I developed as a researcher by learning about and from the perspectives of tutors and students in this study, while putting my own opinions aside.

Participants in this study were nonchalant about formalised types of professionalism, for example, which clashed with my own world view. Formalised professionalism in this context means membership of a professional body, union or trade association for participation in communities of practice for professional development, career progression and industry representation. Many tutors gave good reasons why they eschewed formalised professionalism in plumbing because, from their perspective, they considered it more associated with industry than teaching. Furthermore, the majority of tutors could see little or no tangible benefits in being a member of a professional body, either in regard to the mandatory membership of the teaching professional body (the IfL) or for plumbing professional or trade bodies. However, this did not mean that the tutors lacked professionalism. The tutors observed in this study acted in a professional way and often with great skill and compassion. Consequently, I often felt humbled by their commitment to doing a job well for its own sake.

Bourdieu's (in Hodkinson and James, 2003: 394) notions of 'habitus' and 'field' are helpful for understanding my own changing identity in relation to those I was researching. Despite my working-class habitus and my researcher identity as a plumber interviewing plumbers, I sensed an inescapable inequality between myself and the participants. I was in a position of power during my research in relation to the tutors and students, who may have expected me to know best in terms of making judgements and interpreting data. Many of the tutors in the study were used to being watched and, along with other marginalised groups of students in further education, 'are common targets for interview projects, providing both models of difference and objects of surveillance and regulation' (Briggs, 2003: 498). The differences in power also had implications for my position in the research as a participant observer. I tried to take the type of reflexive approach advocated by Woolger (in Grenfell and James, 1998: 124) in that 'we need continually to interrogate and find strange the process of representation as we engage in it'. In this sense, I tried to make the familiar strange by considering why people and processes were one way and not another (Erickson, 1973: 16). This was not a simple task, however. The advantage that I had in terms of being a plumber and plumbing teacher conducting research among a like population was also a disadvantage in that I was often too close to see clearly. I underestimated the depth of my own

habitus in the research and found it difficult to move beyond the familiar. Bourdieu and Wacquant (1989: 43) explained, 'when habitus encounters a social world of which it is the product, it finds itself "as a fish in water", it does not feel the weight of the water and takes the world about itself for granted'.

In responding to this problem in educational research, Delamont and Atkinson (in Delamont, 2005: 96) developed strategies to fight familiarity and what 'everybody knows'. Some of these strategies to find the unusual are exemplified in my study by the observations of differences in motivation between younger students and adult students and the problematisation of the unapprenticed as opposed to the familiar notion of studying apprentices. Moreover, the study of non-educational settings, such as the workplace, in my study and the comparisons made between English, Dutch, Danish, German and Canadian vocational studies helped me to fight familiarity in this study (Delamont, 2005). By going into three colleges and five workplaces, I aimed to engage with research by going beyond my own acculturation and experiential knowledge to collect the opinions of others and to see how other people learned in college and work.

The methods I used were participant observation, informal interviews and semi-structured formal interviews. It was intended that the formal interview data would provide the substantive element in representing the participant voice, while the participant observations and informal interview data were used to support or contrast my findings. Therefore, I was 'exploring the educational worlds of actors from their own perspectives' (Pole and Morrison, 2003: 30) and within their own contexts. Although Shuy (2003: 179) argued that contextual naturalness when interviewing 'assures more accurate responses', this was very difficult to achieve in my study, particularly in the college context. I recognised early in the research that informally interviewing younger students with some degree of contextual naturalness was difficult when they were in the company of their peers. It was understandable that my research intervention created some reactivity amongst the students. This included episodes of student bravado and peer pressure on other students to sometimes respond to the informal questioning to the satisfaction of their peer group. In consequence, I conducted 1:1 recorded interviews with students, which took place away from

their peers and, hence, had less contextual naturalness than was originally planned.

Some of the challenges associated with the 'prioritizing of the participant's voice' suggested by Silverman (in Pole and Morrison, 2003: 32-33) may therefore be justifiable in relation to my study. Such challenges included the fact that the 1:1 interview situation placed a heavy burden on interviewees to talk. This challenged the naturalness of the approach in capturing authentic data and, instead, the data were sometimes exposed to formalities of interview processes and interview questions arguably producing predictable insights in some instances (Silverman in Pole and Morrison, 2003). During the informal conversations with tutors and students, they may have also picked up on my interests and this may have influenced their responses in terms of possibly telling me what they thought I wanted to hear. However, there was a level of subjective adequacy in the research in relation to the sufficiency of time spent in the field for me to observe the groups long enough to develop a degree of intimacy and trust with the participants (Bruyn in Layder, 1998: 85-86). In keeping with this trust, I had a responsibility to re-tell the participants' stories with fidelity whereby the 'truth of the matter' is what happened in a situation and fidelity is 'what it means to the teller of the tale' (Blumenfeld-Jones, 1995: 26).

The participant observations and time spent with tutors and students helped me to understand and better interpret these meanings so that I did not misrepresent the sentiments of participants. In some instances, tutors and students may not have wanted to disclose particular types of information because they were positioned, along with the researcher, within the field of acting forces and power relations. In other instances, tutors were pleased with the opportunity to talk anonymously about their experiences and about teaching issues they considered to be close to their hearts. However, as an interpretive researcher, my interpretation of the data is potentially just one of many that might be made and, as such, generalisations cannot be made from this study. However, Bassey (1984: 104) asserted 'the merit of study of single events lies not in the extent to which it can be generalized', but in the extent to which teachers reading it can relate it to their teaching.

Although this study has relevance to the practice of the teaching, learning and assessment of plumbing, other researchers might wish to undertake the same type of study on a larger scale. This might include a greater number of colleges with students of different ages and observations of students in the work context to explore if there are wider variations across the country and, if there are, what the reasons for these might be. In addition, similar studies to this one could be conducted in a different occupational field, such as carpentry, bricklaying or plastering to see if there are differences.

A study in relation to gender in the plumbing industry could also be useful, given that less than 1% of the skilled workforce is female (SummitSkills, 2010a). There was a mixture of male and female plumbing students in this study, however, and so it would be useful to know more about female perceptions and experiences of working in the plumbing industry in England. In regard to the importance of supervision in the workplace and the emphasis placed on working relationships for learning plumbing described in this study, perhaps more could be done to understand the relationships between masters and journeymen on site. Moreover, a study focussing on the way construction workers identify with professionalism or their perceptions of the ways in which they are represented are also areas of interest for further research. Some action research involving college teachers, where they actively try out a range of different pedagogical strategies, would also be of interest given the findings in this study and the implications cited above for greater alignment and integration of theory and practice. Such action research might include a pilot for developing apprentices' on-site experiences as part of assignment approaches to learning and assessment requested by many tutors in this study. These apprentice experiences could be recorded in electronic portfolios to compare and contrast with other apprentices' experiences in different parts of the country.

## **8.6 Contribution to knowledge**

Whilst a number of studies have looked at vocational learning in a broader sense and some have looked at other occupations and their related training, the occupational field of plumbing has never been significantly studied in this manner. The originality of this study is evidenced in the design features of the

methodological approach, which maximises the potential offered by my researcher, plumber and teacher identities in terms of being a participant observer in both college and the workplace. By combining ethnographic snapshot observations of plumbing students in both college and work contexts with formal interviews in college and informal interviewing in both college and work contexts, this study has been able to develop rich data in relation to the tutor's and student's views and experiences in three college contexts.

However, the findings are not just based on the self-reporting of others but on my own observations in the different settings. My biographical experiences allowed me to get 'up close' to participants and develop a degree of trust, which enabled deeper insights into their occupational lives. My unique empirical position in the research allowed me to explore, first hand, the terrain and complexities of the plumbing curriculum from the perspectives of both tutors and students in terms of theory and practice and how teaching, learning and assessment was shaped in the workplace and classroom. This type of methodology allows, I hope, the reader to have a sense of entering the 'lived reality of the case', helping them to understand and empathise with the world that is being described (Ernest, 1994: 25). In this sense, the study leads the reader through the settings of further education and the workplace, affording them a window onto the lives and struggles of the people who teach and learn there.

My in-depth analysis of these complex phenomena provides an evidence base from which to critique existing policy in regard to vocational education and the unique features of the plumbing industry. This study builds on the authentic voice of participants while showing how their perceptions and experiences were both shaped and constrained by the current policy context. The key findings of the study highlight the importance of the need for a clear and coherent relationship between theory and practice in the plumbing curriculum, the importance of supervised work experience and the need for authentic assessments. The conclusion of this thesis presents key implications for policy and practice, which are grounded in these empirical findings.



The findings in my study also support Gulikers et al (2008) in that it identifies a key need to explicate stakeholder perceptions in regard to the authenticity of simulated training assessment in college contexts. This provides a means of developing authentic assessments that appropriately resemble professional practice in the eyes of students, teachers, workers and employers. This would entail gathering stakeholder perceptions on whether college assessments are deemed as low-fidelity or high-fidelity in nature. Such classifications of aspects of the plumbing curriculum and assessment in college contexts may signify their limitations or potential for providing low-road and/or high-road skills and knowledge development and transfer (Rush et al, 2010). Hence, a collaborative approach to the development of authentic simulated training assessment is required to reduce the gap between college learning and working, which has been identified as a key need for plumbing training in my study (Gulikers et al, 2008).

## **8.7 Concluding note**

It is apparent from the findings in this study that apprenticeship provides the most reliable way of occupational training for plumbing as compared with unapprenticed routes through full-time college training. In the interests of quality, safety, and the welfare of young people and the wider public, some of the historical antecedents of apprenticeship need to be revisited. This is particularly important in regard to the implications for policy and practice outlined in this study, along with an emphasis on the need for a new apprenticeship settlement. Apprenticeship starts with the apprentice's employment in the company of qualified co-workers. The apprentice's work learning can be enhanced with relevant, authentic and co-ordinated college training, with high-fidelity assessment processes. The apprenticeship settlement for the apprentice's time-serving on low wages should be journeyman status and realistic opportunities for corresponding employment.

## Appendix A Certificate of ethical research approval

**STUDENT HIGHER-LEVEL RESEARCH**



School of Education and Lifelong Learning

### Certificate of ethical research approval

#### **STUDENT RESEARCH/FIELDWORK/CASEWORK AND DISSERTATION/THESIS**

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

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

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

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

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Your name: Simon Reddy

Your student no: 570035125

Degree/Programme of Study: PhD in education

Project Supervisor(s): First - Professor William Richardson and Second - Dr Nadine Schaefer

Your email address: sr265@exeter.co.uk

Tel: 01803 559587

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#### **Title of your project:**

Understanding vocational pedagogy in early 21<sup>st</sup> century England: an ethnographic study of plumbing apprentices in college and workplace contexts.

#### **Brief description of your research project:**

This is an ethnographic study that aims to understand vocational pedagogy (teaching, learning and assessment) from the perspectives of plumbing apprentices, in work and college settings. Other stakeholders such as teachers, employers, assessors will be observed and informally interviewed as part of the research process. The study aims to address a number of research questions associated with vocational culture and interactions

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

between participants in their work and college settings. Contextual issues of power, politics, economics, history, society will be discussed, along with how they impact be on vocational pedagogy. Furthermore, I aim to seek why candidates chose to undertake plumbing training, while elucidating what meanings are given to notions of occupational competence and professionalism.

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

The research involves ethnographic work in and outside of FE colleges. All the research 'participants' will be exclusively, aged over 16 years. The key research participants will be plumbing apprentices employed with firms or they will be on programme-led apprenticeships in a college setting. In addition to apprentices, employers, teachers and assessors aged over 16 years will participate in the research. I may also call on other stakeholders within the wider macro context, such as representatives from sectors skills councils, training providers, trade associations and professional bodies, in order to collect data on contextual issues.

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

***Informed Consent***

When working in colleges, permission for conducting the research will be sought from the institution via the principal. As well as seeking verbal and written consent from individual apprentices, I will seek permission to conduct research in the workplace, from their employers. As well as following BERA ethical guidelines, I will comply with any particular guidelines that are specified by the particular institutions I am researching within. I will ask employers and college managers, to notify the relevant staff, such as workers, teachers and apprentices, so that they are informed of my research activity. My research is specifically aimed at those participants aged over 16 years and there have been no children or adults identified for participation with special needs. When conducting research in colleges and work places, verbal consent will initially be sought from each participant who I come into face to face contact with. However, participants' written consent will be sought by means of a consent form similar to the one on the SELL website.

I will construct a research flyer (an A4 sheet, which includes details like: my name and brief account of background, email address, university name, first supervisor name, title of study, aim of study and list of basic research ethics including rights to withdraw at any time, confidentiality procedures and anonymity of participants) and give one to each participant, in colleges and workplace; furthermore I will pin a flyer to the wall in staff rooms or canteens, where staff, workers and apprentices congregate and chat, during breaks. I will also ask participants to read the details set out on the research flyer, and tell them that they can contact me in private, if they do not wish to participate.

***Anonymity***

The use of pseudonyms will guarantee the anonymity of all participants and institutions involved in the research; these change the names of people and places within the study. Anonymity will further be aided by collecting samples across multiple sites, with multiple participants. I will focus on fifteen apprentices, equally distributed across three different

colleges, choosing about five to observe with employers at work. As I will only focus on one particular group of apprentices at each college, I will take steps to make sure the group's individual teacher(s) cannot be identified by the statistics I collect, that are particular to that group within that institution e.g. a teacher with a small group of six students would stand out, from teachers in other institutions that may have much larger groups. For this reason, I will arrange my sample to include five apprentices from each college group, without stating the total number of students in the class.

### **Confidentiality**

Confidentiality of participants and the organisations involved will be maintained before, during and after the research study. I will be careful not to discuss conversations, statements, comments or events between participants and institutions concerned. I will keep all matters concerning my research confidential outside of, or between college and work institutions. See below for details of safely storing, confidential research material.

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

An ethnographic approach means that I will be up close to my research participants, this means 'being there' in the process of the research. The research methods will include:

- Participant observation of apprentices in college and work environments (I will use the method of participant observation as an 'overt' full insider. This may take the form of 'tea-time' conversations between groups of teachers, apprentices and workers, where notes will be taken and written up later the same day. I intend to work alongside teachers, employers and apprentices, so as to not appear as an 'inspector'. It is hoped that this will help the participants feel at ease and reduce levels of anxiety.
- Semi-structured interviews or informal chats recorded as fieldnotes to be written up later (every effort will be made to interview participants in an open, comfortable and relaxed environment, which is mutually convenient to both the researcher and each participant. Interviews will be terminated if it is clear that the participant is suffering from any distress.) – Note: any direct quotes from participants will be recorded verbatim and checked for accuracy and meaning with the participants.
- Enumeration data in the form of 'time and motion', (recorded as fieldnotes for writing up later). Note: See anonymity section above, for care that must be taken when recording statistics that may lead to the identification of participants and institutions.

The type of study I am undertaking requires the description of phenomena and events, not my judgement of participants' actions as right or wrong – so it is up to me to describe events, and talk to participants and try to represent a context bound, social reality as accurately as possible. This may mean sharing transcribed fieldnotes, relevant to particular participants i.e. if they make a request to read what I have written about them during the process observation. If, on reading my transcribed notes, a participant feels they may come to harm or feel any distress, then there will be negotiation and steps taken to eliminate this, to meet the satisfaction of the participant. During the research process I will make every effort to ensure the safety of the research participants by keeping their comments, identities and institutions confidential by pseudonyms and the secure use of data collection and storage. This also includes not passing on any information or anything that has been said to others, within the institution.

Analysis will be ongoing and grounded within the empirical data. It is my intention to carefully integrate the micro analysis of the fieldwork, with the wider macro context. However, extant theory and contextual issues will guide the emergence and construction of concepts and micro-theory, which will be understood through an integrated conceptual framework.

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

Any note pads to recorded field-notes will be stored on my person, in a purpose made pouch, at all times during the field work. Thereafter, field-notes will be kept securely in a locked drawer or cabinet and electronic data stored in a password protected file. There will be no video, photographic or tape recorded data collected in my study.

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

The aim of the research is to understand vocational learning, through the perceptions of apprentices and other stakeholders including teachers, assessors and employers, within wider contextual frameworks (institutional, political, social, historical, and economic). If a situation arises where a participant or group holds conflicting world views to the institution they are associated with, e.g. an employee disagrees with the institutional management structure they are associated with. Then this person must be protected from identification, from those within the institution concerned, to prevent harm coming to that person. By taking a highly reflective and reflexive approach to the research, and recognising the way I am positioned and the way I position others, I will be aware of these situations arising and seek to avoid them at every instance. I have also chosen three college institutions in which to collect data and a number of different employers and apprentices, which improves the quality of the sample to some extent, but in particular, it reduces the risk of (mis)identification of participants and the institutions concerned. Having spoken to staff at colleges regarding issues of identification and confidentiality, they were reassured that two other colleges were involved in my study, which makes identification of participants much more difficult than if there were just one or two colleges involved.

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

**I hereby certify that I will abide by the details given above and that I undertake in my thesis to respect the dignity and privacy of those participating in this research.**

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

Signed:.....  ..... date: 8-10-09.....  
.....

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

**This project has been approved for the period:**

**until:**

**By** (above mentioned supervisor's signature):

..... Silvia Kubacka ..... **date:** 8/10/09 .....

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

---

**SELL unique approval reference:**..... D/09/10/8 .....

**Signed:**..... Silvia Kubacka ..... **date:** 10/10/2009 .....

.....  
**Chair of the School's Ethics Committee**

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

## **Appendix B Research information sheet and consent forms**

Name of Researcher: **Simon Reddy** email: [sr265@exeter.ac.uk](mailto:sr265@exeter.ac.uk)

Telephone number: 01803 559587

Research Institution: University of Exeter

Type of Study – Philosophy Doctorate in Education (PhD)

### ***Title of Study***

A study of students' and teachers' experiences and perceptions of the teaching and learning of plumbing in college and work place contexts.

### ***Aim of Study***

This study aims to understand teaching, learning and assessment, associated with plumbing craft apprenticeships and preparatory types of college training. Data collection methods include observing plumbing apprentices and conducting informal interviews in college and work place situations. This will be done with great care and I intend to blend in as a teaching assistant or helping hand. It is my intention to describe, interpret and understand the experiences of teachers, employers and apprentices and represent these in a written report known as a thesis. It is hoped that this study will contribute to the plumbing industry in terms of professional practice and act as a resource for practitioners, institutions and policy makers to better understand teaching learning and assessment. I am relying on the good will of plumbers, teachers and employers to support me in this endeavour.

### **Ethics**

This study will be conducted in line with university ethics protocol approved by an ethics committee. It will also comply with British Educational Research Association (2004) guidelines for ethical research. Candidates will be asked to participate and consent verbally or in writing, by signing the consent form provided (see next page). Participants will be offered the right to withdraw at any time or decline participation. All names and identities of staff, students and institutions will be confidential and protected by pseudonyms. Participants will have access to the finished thesis on request.

### ***Researcher Background***

I currently run my own plumbing business in Paignton, Devon, where I live with my wife and three children. Alongside running my own business, I have taught plumbing in Further Education for many years. All my research is self funded and I receive no payments or grants. I rely on the support of the plumbing and teaching community to help me in my studies.

## RESEARCH CONSENT FORM – PARTICIPANT COPY

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

I understand that:

- There is no compulsion for me to participate in this research project and, if I do choose to participate, I may at any stage withdraw my participation;
- I have the right to refuse permission for the publication of any information about me;
- Any information which I give will be used solely for the purposes of this research project, which may include publications;
- If applicable, the information which I give may be shared between any of the other researchers participating in this project in an anonymised form;
- All information I give will be treated as confidential;
- The researcher will make every effort to preserve my anonymity

.....  
(Signature of participant)

(Date) .....

.....  
(Printed name of participant)

.....  
(Signature of researcher)

One copy of this form will be kept by the participant; a second copy will be kept by the researcher. If you have any concerns about the project that you would like to discuss, please contact:

**Simon Reddy, Tel: 01803 559587 or sr265@exeter.ac.uk**

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



## **PLEASE GIVE THIS SHEET TO YOUR EMPLOYER**

(If you are in agreement to participating in the research)

Dear Sir or Madam

I am conducting some research for my Doctoral study, which focuses on vocational teaching and learning. I currently work as a plumber and have taught plumbing for many years in Further Education colleges. I have been given permission to work alongside your apprentice in the college as part of the research process, and would now like to follow your apprentice into the work place for a few days. This is so that I can see how learning and qualifications relate to real work situations, compared to college. Furthermore, it also provides employers an opportunity to voice their opinions on training and qualifications, should they wish.

I only need to spend a total of 2 days per week (over two weeks) working with your apprentice (provided they are in agreement) as an unpaid mate or help. I have CSCS construction-site safety card and gas safe registration.

Note: my aim is not to make judgements about your firm, but to describe the process of how apprentices learn in order to develop conclusions about the current way we go about vocational education and training.

Please support me in this aim by at least talking this over with me, which will only take ten minutes or so:

Telephone: 01803 559587

Email: [sr265@exeter.ac.uk](mailto:sr265@exeter.ac.uk)

Yours sincerely

Simon Reddy

## CONSENT FORM - RESEARCHER COPY

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

I understand that:

- There is no compulsion for me to participate in this research project and, if I do choose to participate, I may at any stage withdraw my participation;
- I have the right to refuse permission for the publication of any information about me;
- Any information which I give will be used solely for the purposes of this research project, which may include publications;
- If applicable, the information which I give may be shared between any of the other researchers participating in this project in an anonymised form;
- All information I give will be treated as confidential;
- The researcher will make every effort to preserve my anonymity

.....  
(Signature of participant)

(Date).....

.....  
Telephone number  
(Optional)

.....  
(Printed name of participant)

.....  
(Signature of Researcher)

One copy of this form will be kept by the participant; a second copy will be kept by the researcher. If you have any concerns about the project that you would like to discuss, please contact:

**Simon Reddy, Tel: 01803 559587 or sr265@exeter.ac.uk**

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

## **Appendix C Semi-structured interview schedules for students and tutors**

### **Student interview questions for Colleges C1, C2 and C3**

1. Why did you choose plumbing as a career?
2. Can you describe the type of work you do?
3. How does your work relate to what you do at college?
4. Does what you learn at college help you at work, and how much?
5. What do you enjoy about college? Is there anything you dislike at college?
6. Do you prefer the theory or the practical lessons? Why? Can you describe a typical lesson?
7. What is the purpose of theory lessons? Do you find the theory assessments challenging? Do they assess your job knowledge?
8. Does the theory lesson relate to what you do in the practical sessions – would you say that the practical lesson helps you to pass the theory exam?
9. Do teachers reinforce what you have learned during the theory lessons within the practical session? Is there an effort made by the teachers to bring the theory of the classroom to the workshop? – give examples.
10. What would you change about the course?
11. Have you ever engaged with learning outside of college or work? What was the purpose of this learning?
12. Do you know of any associations, trade bodies or professional bodies associated with plumbing and heating – what is their purpose?
13. Where do you see yourself in 5 years time?

### **Tutor interview questions at College C1:**

1. Please tell me how you came to be a plumber and teacher.
2. What are the important things about your teaching practice?
3. Do you have any concerns over the current way plumbers are trained? What about students without work placements? How many? Where do they go on completion? What do you think of this?
4. How do you think plumbing training can be improved?
5. Do your students engage with any learning outside of college or work?

6. How do you think practical lessons help students learn compared to theory lessons? Is half a day of each the way it should be?
7. What are your thoughts on the way plumbing is assessed?
8. How do you judge the quality of the training provision you provide?
9. What do you consider to be the key contributors to successful teaching and learning at this institution?
10. Do you engage with any professional learning outside of college e.g. teacher training, institutes, trade associations, conferences, sectors skills groups etc.?

### **Teacher and assessor interview questions at C2 and C3**

1. How did you come to be involved with plumbing and teaching?
2. How would you describe your teaching practice?
3. What are the aspects of your teaching practice that are valuable to you?
4. Would you choose to do it differently given the choice? How would you change it?
5. Tell me what you know of students without work placements who attend courses on plumbing? Do they struggle? Do you have any concerns? What are the comparative numbers?
6. What happens to these learners on completion? Can a plumber set up in business and conduct reliable work if they have just completed, say, a technical certificate?
7. Do your students engage with any learning outside of college or work and how would you describe this learning? How would you describe their attitude to this?
8. Do you think the day at college should be split into half practice and half theory? Why/not?
9. Do you think that the practical activities support the theoretical learning? For example, do the practical lessons help students to pass the theory assessments?
10. What are your thoughts on the way plumbing is assessed? What impact does this have on teaching and learning?
11. Do you engage with any professional learning outside of college e.g. teacher training, institutes, trade associations, conferences, sectors skills

groups? How would you describe the general attitude of FE staff towards teacher training and professional development (CPD)?

## Appendix D Example of analysis and coding used in study

Listed below are some examples of the thematic analysis used in this study. The examples are taken from interview transcriptions with two tutors and one assessor, representing each college in the study C1, C2 and C3. The transcribed interview sections were firstly open coded. Sections of text were underlined (highlighted in colours) and these were allocated a code. The codes shown in the examples relate to the categories of 'advantage of apprenticeships', 'full-timers' lack of work-based learning', 'differences in student motivation between adult students and young students' and 'possible reasons for lack of motivation in young students'. These codes are shown in brackets following the underlined text, which is respectively coloured red, yellow, green and pink. Following the open coding examples, there is a section on thematic analysis showing how the code categories were organised into code families, which relate to research themes. These themes were considered in light of the research questions and sub-questions.

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### Tutor Larry C1:

*Researcher - I understand your point about plumbers being engineers and plumbers solving problems; do you think the structure of the course, as it is, contributes to problem-solving skills?*

Tutor Larry - No, cause I think you only get that in the workplace. We can't create a scenario that every time you go to a fault, a plumbing fault, it can be different and the different circumstances that surround that. So I think that, as a college, we can probably explain how a system works and the technology behind that and we can set a few faults that are similar, but real problem-solving is going to come out in industry (red code - advantage of apprenticeships, doing problem-solving at work).

*Researcher - But that seems to be a problem, if we are dependent upon industry for certain aspects of the training, those students that are in colleges without work placements are going to suffer a bit?*

Tutor Larry - Yeah, Yes, definitely (yellow code - full-timers' lack of work-based learning).

*Researcher - Do you think that it could be a problem for these types of students that do not have work placements to actually grasp the concepts that are being taught in college?*

Tutor Larry - I think where it becomes a problem is the practical aspects because where we have an apprentice, they are out practicing in industry four days a week and only get to come into college one day a week (red code - advantage of apprenticeships, practical experience and time-serving) and if you look at a full-time student they are coming in college three days a week and getting no site experience (yellow code - full-timers' lack of work-based learning).

*Researcher - In terms of your students, do the students you teach engage with learning outside of college and outside of work? Are they the sort of students that would take it upon themselves to do some self-resourced learning?*

Tutor Larry - Huh, Nah, No...they wouldn't no, I mean, its ya know, you might get out of group of twenty (silence) the more students that might be inclined to do that would be the more mature kind of students, the ones that are trying to change their lives for the better and you know...are very keen on doing that and see the benefits (green code - differences in student motivation between adult students and young students, motivated adults and lacking motivation in younger students) I think 16-year-olds really can't see the...I really think they haven't got a work ethics...you know...a lot of them come from...you know I have worked at colleges in socially deprived areas and erm...and quite often they can't see the value of what they are doing (pink code - possible reasons for lack of motivation in young student, reason for youngsters lacking motivation social background).

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## Assessor Luke C2:

*Researcher - What are your thoughts on the current system of plumbing training?*

Assessor Luke - I think... **at the moment we've got full timers coming through, they are not actually getting the full picture of the plumbing. I know we can simulate it as best we can here and we are quite lucky, we are well resourced, we have good workshops. We can simulate it well, but you don't actually get that feeling of the pressure on you to get the job done and the problems,** because actually plumbing... (yellow code - full-timers' lack of work-based learning, full-timers lacking authentic training) **...the main part of plumbing is getting over problems that you come up against. And we can't...it's very, very hard to simulate that in here** (red code - advantage of apprenticeships, problem solving) **So full-timers aren't actually getting the full training** (yellow code - full-timers' lack of work-based learning).

*Researcher – Yes.*

Assessor Luke - **Whereas the apprentices see it different, they are out there...they see it here, they see a simulated thing, but they are getting their training out there, so they see the bigger picture.** (red code - advantage of apprentices, getting authentic training at work).

*Researcher - What do you think their attitude is like toward the training? So they're at work all week and then they come into college, do you think they find the college work relevant to what they do at work?*

Assessor Luke - A lot of them will link it, **some of them will think, I've been doing that all week why do I have to do it again,** (pink code - possible reasons for lack of motivation in young students, repetition) so it's a varying sort of opinion on it...so I feel that the apprentices will link it together. **Also half the stuff — you will notice that apprentices will complete it a lot faster because it's stuff, like I said, that they have come across before.** (red code - advantage of apprenticeships,



because they complete college tasks much quicker than full-timers because of work-based learning).

*Researcher - Do you think that the students engage in learning outside of college or work? Do they do homework? Are they inclined to?*

Assessor Luke - **That very much depends on the age and the individual situation of the student.** (green code - differences in student motivation between adult students and young students, motivation of students associated with age and circumstances) **If it's someone who has a very busy lifestyle outside, they might get onto it for a short period** (pink code - possible reasons for lack of motivation in young students, reason due to student lifestyle). If it's somebody that's got more time, they will probably spend a lot more time on it. It very much depends on their particular situation outside of college.

*Researcher - Is it the age of the student that determines that, is it the younger ones?*

Assessor Luke - **The younger ones will try to do as little as possible sometimes;** (green code - differences in student motivation between adult students and young students, motivation of younger students lacking) we have got to try to help them see it as a way of getting their goal.

*Researcher - Do you think the attitude of the plumbing students is one of engagement with the plumbing industry or do you think that they have a poor attitude towards their profession or occupation?*

Assessor Luke - **Again, that tends to depend on age. If they are older, they seem to be more engaged, you know, with what they learn at college.** (green code - differences in student motivation between adult students and young students, adult students more motivated than youngsters) **The younger ones seem to think that college is still similar to school, where they will come in and they will think, you know, I can take it a bit easier.** (pink code - possible reasons for lack of motivation in young students, reason is youngsters think college is similar to school and they can take it easy).

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**Tutor Darrel C3:**

*Researcher - How would you choose to do things differently given the choice?*

Tutor Darrel - Is this for apprentices?

*Researcher – Well, it can be for apprentices or full-time students. Do you think there is a difference between the two? Do you think we should be making distinctions?*

Tutor Darrel - Yes, I think it's a lot harder for full-time students because they are not on site and they can be working in Sainsburys three days a week and then come in for plumbing two days a week. (yellow code - full-timers' lack of work-based learning, full-time students disadvantaged). Whereas apprentices live and breathe plumbing because it is what they do every day. When you do scenarios, the apprentices can relate to it. (red code - advantage of apprenticeship, apprentices can relate to college learning) the full-timers...you've got to put a lot more thinking into the full-timers. (yellow code - full-timers' lack of work-based learning, full-time students more difficult to teach because of lack of work-based learning).

*Do you think the students that you teach engage with any learning outside of college or work and how would you describe this learning?*

Tutor Darrel - I think they will pick up their Playstation more than their books. Like I said, I think the ones that really want it do. I think the ones that are just drifting, they are doing plumbing because their parents say there is good money in plumbing. (pink code - possible reasons for lack of motivation in young students, reason due to students satisfying parents' wishes). Their heart's not really in it and I think you can spot them a mile off and, to be honest with you, I kind of think fair play to half of them because they are still coming in because if my heart weren't in something, I don't think I could complete it. And they do turn up every day and they do come in most of them, but you know, they don't revise

no where near as much as they should because at the end of the day, they are getting their dole money or their EMA, as they call it now, to come into this college. (pink code - possible reasons for lack of motivation in young students, reason is that students full-timers are unemployed and get dole whether they pass or fail). So they should spend more time revising. But, like I say, most students these days, 16-18, they spend more time on their Playstations than they do on their books. (green code - differences in student motivation between adult students and young students, lacking motivation of younger students)

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### **Example of thematic analysis used in study**

In the example below, the theme relates to sub-question 4: What is the importance of work experience in the teaching and learning of plumbing? However, the coding was also open to emergent themes and categories, which is exemplified in this case with the green theme, which coded the difference in motivation between adult students and younger full-time students and apprentices aged between 16 and 19 years old.

The interview transcriptions were printed out and initially open coded by hand, underlining sections on paper. This process was then continued using Microsoft Word colour functions for the text. The codes for each tutor and student were then organised into themes under broad headings. For the purposes of clarity, however, the example below makes reference to tutor responses only. Student perceptions were analysed in the same way.

### **Category (broad heading): Differences between students**

For three tutors/assessors interviewed across three different college sites C1, C2 and C3:

Tutor Larry C1/differences between students

- Tutor Larry C1/Full-timers lacking work-based learning – 'if you look at a full-time student, they are coming in college three days a week and getting no site experience'

- Tutor Larry C1/Full-timers lacking work-based learning – ‘Yeah, Yes, definitely’...in reply to question of full-timers’ learning suffering
- Tutor Larry C1/Advantage of apprenticeship/problem-solving – ‘real problem-solving is going to come out in industry’...‘cause I think you only get that in the workplace’
- Tutor Larry C1/Advantage of apprenticeship/better performance – apprentices perform better in college practical ‘because where we have an apprentice, they are out practising in industry four days a week’
- Tutor Larry C1/Younger students lacking motivation – ‘Huh, Nah, No...they wouldn’t no’ learn in their own time
- Tutor Larry C1/Adult students more motivated – autonomous learning ‘the more students that might be inclined to do that would be the more mature kind of students’
- Tutor Larry C1/possible reasons for lacking motivation – ‘I think 16-year-olds ...haven’t got a work ethics...a lot of them come from...you know...I have worked at colleges in socially deprived areas and erm...and quite often they can’t see the value of what they are doing’

#### Assessor Luke C2/differences between students

- Assessor Luke C2/Full-timers lacking authentic learning/simulation - at the moment, we’ve got full-timers coming through; they are not actually getting the full picture of the plumbing...So full-timers aren’t actually getting the full training’
- Assessor Luke C2/Full-timers lacking authentic learning/lack of pressure - ‘We can simulate it well, but you don’t actually get that feeling of the pressure on you to get the job done and the problems’
- Assessor Luke C2/Advantage of apprenticeship/problem-solving - the main part of plumbing is getting over problems that you come up against. And we can’t...it’s very, very hard to simulate that in here
- Assessor Luke C2/Advantage of apprenticeship/time-serving – ‘apprentices see it different, they are out there...they see it here, they see a simulated thing, but they are getting their training out there, so they see the bigger picture’

- Assessor Luke C2/Advantage of apprenticeship/better practical performance – ‘also half the stuff — you will notice that apprentices will complete it a lot faster because it’s stuff, like I said, that they have come across before’
- Assessor Luke C2/Younger students lacking motivation – ‘The younger ones will try to do as little as possible sometimes’
- Assessor Luke C2/Adult students more motivated – ‘Again, that tends to depend on age. If they are older, they seem to be more engaged, you know, with what they learn at college’
- Assessor Luke C2/Reasons for lacking motivation – ‘If it’s someone who has a very busy lifestyle outside, they might get onto it for a short period’
- Assessor Luke C2/Reasons for lacking motivation – ‘The younger ones seem to think that college is still similar to school, where they will come in and they will think, you know, I can take it a bit easier’

#### Tutor Darrel C3/Differences between students

- Tutor Darrel C3/Full-timers lacking relevant work-based learning – ‘I think it’s a lot harder for full-time students because they are not on site and they can be working in Sainsburys three days a week and then come in for plumbing two days a week’
- Tutor Darrel C3/Full-timers lacking work-based learning - more difficult to teach, the full-timers...you’ve got to put a lot more thinking into the full-timers
- Tutor Darrel C3/Advantage of apprenticeship/relating to learning – ‘Whereas apprentices live and breathe plumbing because it is what they do every day. When you do scenarios, the apprentices can relate to it’
- Tutor Darrel C3/Younger students lacking motivation – ‘they don’t revise nowhere near as much as they should’
- Tutor Darrel C3/Younger students lacking motivation – ‘they should spend more time revising. But, like I say, most students these days, 16-18, they spend more time on their Playstations than they do on their books’
- Tutor Darrel C3/Reasons for lacking motivation – ‘I think they will pick up their Playstation more than their books...I think the ones that are just

drifting, they are doing plumbing because their parents say there is good money in plumbing’

- Tutor Darrel C3/Reasons for lacking motivation – ‘they are getting their dole money or their EMA, as they call it now, to come into this college’. Pass or fail, they still get paid.

## Code families and emergent themes

Emergent theme 1 – The importance of work experience (supported by yellow and red code families below), addressing research sub-question 4: What is the importance of work experience in teaching and learning of plumbing?

(Yellow code family) Tutor perceptions of full-time students’ learning disadvantage in college due to lack of work-based learning:

- Tutor Larry C1/ Full-timers lacking work-based learning – ‘if you look at a full-time student, they are coming in college three days a week and getting no site experience’
- Tutor Larry C1/Full-timers lacking work-based learning – ‘Yeah, Yes, definitely’...in reply to question of full-timers’ learning suffering
- Assessor Luke C2/Full-timers lacking authentic learning/simulation - ‘at the moment, we’ve got full-timers coming through; they are not actually getting the full picture of the plumbing...So full-timers aren’t actually getting the full training’
- Assessor Luke C2/Full-timers lacking authentic learning/lack of pressure - ‘We can simulate it well, but you don’t actually get that feeling of the pressure on you to get the job done and the problems’
- Tutor Darrel C3/Full-timers lacking relevant work-based learning – ‘I think it’s a lot harder for full-time students because they are not on site and they can be working in Sainsburys three days a week and then come in for plumbing two days a week’
- Tutor Darrel C3/Full-timers lacking work-based learning - more difficult to teach, ‘the full-timers...you’ve got to put a lot more thinking into the full-timers’

(Red code-family) Tutor perceptions of apprentices' advantage in their college learning due to work-based learning (time-serving):

- Tutor Larry C1/Advantage of apprenticeship/problem-solving – 'real problem-solving is going to come out in industry'... 'cause I think you only get that in the workplace'
- Tutor Larry C1/Advantage of apprenticeship/better performance – apprentices perform better in college practical 'because where we have an apprentice, they are out practising in industry four days a week'
- Assessor Luke C2/Advantage of apprenticeship/problem-solving - the main part of plumbing is getting over problems that you come up against. And we can't...it's very, very hard to simulate that in here
- Assessor Luke C2/Advantage of apprenticeship/relating to learning – 'apprentices see it different, they are out there...they see it here, they see a simulated thing, but they are getting their training out there, so they see the bigger picture'
- Assessor Luke C2/Advantage of apprenticeship/better practical know-how – 'also half the stuff, you will notice that apprentices will complete it a lot faster, because it's stuff, like I said, that they have come across before'
- Tutor Darrel C3/Advantage of apprenticeship/relating to learning – 'Whereas apprentices live and breathe plumbing because it is what they do every day. When you do scenarios, the apprentices can relate to it'

The tutor perceptions suggest full-timers are disadvantaged owing to their lack of work-based learning and exposure to limited training in simulated college contexts. However, apprentices have the advantage of work experience, which provides opportunities for problem-solving and authentic learning, which help them to relate to college learning. These codes and code families support the theme of 'the importance of work experience', which addresses research sub-question 4 (in Table 3.3).

**Emergent theme 2** – Adult students were perceived by tutors as generally more motivated in college than younger students aged 16 to 19 (supported by green and pink code families below). The codes and code families help in addressing an aspect of the main research question associated with full-time plumbing courses, which is, 'What are tutors' and students' perceptions and experiences of full-time college courses and apprenticeships in plumbing?'. (Green code-family) Tutors perceive adult students to be generally more motivated in college learning than the majority of younger full-time students and apprentices:

- Tutor Larry C1/Younger students lacking motivation – 'Huh, Nah, No...they wouldn't no' learn in their own time
- Tutor Larry C1/Adult students more motivated – autonomous learning 'the more students that might be inclined to do that would be the more mature kind of students'
- Assessor Luke C2/Younger students lacking motivation – 'The younger ones, will try to do as little as possible sometimes'
- Assessor Luke C2/Adult students more motivated – 'Again, that tends to depend on age. If they are older, they seem to be more engaged, you know, with what they learn at college'
- Tutor Darrel C3/Younger students lacking motivation – 'they don't revise nowhere near as much as they should'
- Tutor Darrel C3/Younger students lacking motivation – 'they should spend more time revising. But, like I say, most students these days, 16-18, they spend more time on their Playstations than they do on their books'

(Pink code-family) Tutors give diverse reasons to support their perceptions of why some younger full-time students and apprentices are lacking motivation in college:

- Larry C1/possible reasons for lacking motivation – 'I think 16-year-olds ...haven't got a work ethics...a lot of them come from...you know...I



have worked at colleges in socially deprived areas and erm...and quite often they can't see the value of what they are doing'

- Assessor Luke C2/Reasons for lacking motivation – 'If it's someone who has a very busy lifestyle outside, they might get onto it for a short period'
- Assessor Luke C2/Reasons for lacking motivation – 'The younger ones seem to think that college is still similar to school, where they will come in and they will think, you know, I can take it a bit easier'
- Tutor Darrel C3/Reasons for lacking motivation – 'I think they will pick up their Playstation more than their books...I think the ones that are just drifting, they are doing plumbing because their parents say there is good money in plumbing'
- Tutor Darrel C3/Reasons for lacking motivation – 'they are getting their dole money or their EMA, as they call it now, to come into this college'.

Pass or fail, they still get paid.

Tutors described various reasons why they thought younger students were generally lacking motivation to engage with learning both in their own time and in college generally. In contrast, they described adult students as motivated to be self-directed in their learning and to be likely (and interested enough) to learn in their own time. Thus, the codes, code families and themes help to address an aspect of the main research question associated with perceptions and experiences of full-time college courses and apprenticeships in plumbing. It is suggested that the majority of younger students lack motivation for diverse reasons. Younger students were also described in emergent theme 1 as disadvantaged because of the lack of work-based learning shown in the yellow code family. Therefore, there are multiple themes relating to reasons why full-time plumbing courses may not be appropriate for young peoples' preparation for entry into the plumbing occupation from the perspectives of tutors.

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## Glossary

AAP	Advanced Apprenticeship Programme
ACS	Accredited Certification Scheme
APHC	Association of Plumbing and Heating Contractors
ASA	Advertising Standards Authority
ATLS	Associate Teacher Learning and Skills
BERA	British Educational Research Association
BIS	Business, Innovation and Skills
BSE	Building Services Engineering
BTEC	Business and Technology Education Council (vocational qualifications)
C1	College 1
C2	College 2
C3	College 3
C&LG	Communities and Local Government
CBE	Competence-based education
CIPHE	Chartered Institute of Plumbing and Heating Engineering
cobs	College observation
CPD	Continuing Professional Development
CPS	Competent Person Schemes
CTLLS	Certificate to Teach in the Lifelong Learning Sector
DCSF	Department for Children, Schools and Families
DIUS	Department for Innovation, Universities and Skills
DTLLS	Diploma to Teach in the Lifelong Learning Sector
EUskills	Energy & Utility Skills
FE	Further education
GILG	Gas Industry Liaison Group
Gola	Global Online Assessment
HVCA	Heating and Ventilating Contractors' Association

IfL	Institute for Learning
ILR	Individual Learner Record
LPP	Legitimate peripheral participation
LSC	Learning and Skills Council
MA	Modern Apprenticeships
MSC	Manpower Services Commission
NAPT	National Association of Plumbing Teachers
NAS	National Apprenticeship Service
NCVQ	National Council for Vocational Qualifications
NVQ	National Vocational Qualification
Ofsted	Office for Standards in Education, Children's Services and Skills
ONS	Office for National Statistics
PTLLS	Preparing to Teach in the Lifelong Learning Sector
QTLS	Qualified Teacher Learning and Skills
RLE	realistic learning environment
SFA	Skills Funding Agency
SSC	Sector Skills Council
SummitSkills	The Sector Skills Council for BSE
SVQ	Scottish Vocational Qualification
TEC	Training and Enterprise Councils
TUC	Trade Union Congress
Unite	A British trade union
VET	Vocational education and training
WRL	Work-related learning
wobs	Work observation
YOP	Youth Opportunities Programme
YTS	Youth Training Scheme

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