


**Workplace learning experiences of TVET College
candidates in learnership programmes: An
exploration of the workplace learning environment**

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Philosophy Degree in the Institute for Post-School Studies, Faculty of
Education, University of the Western Cape.

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DECLARATION

I, GERALD VOLLENHOVEN, declare that the contents of this dissertation represent my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the University of the Western Cape.

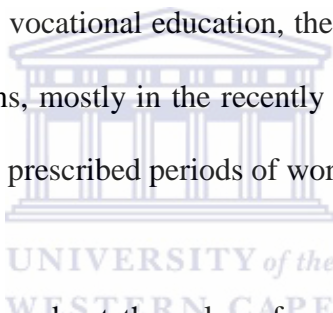
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ABSTRACT

Skills development policies in South Africa and further afield consider learning in and from the workplace as critical to the training of artisans at intermediate level. Since the inception of democracy, South Africa has become part of a globally competitive economic arena where highly skilled workers capable of engaging with new technology in a changing environment are increasingly required. Continuous innovation, it is held (Kraak, 1997), is dependent on the presence of two knowledge forms in society and work: an abundance of formal (scientific and technological) knowledge, and skilled worker ‘know-how’ or tacit knowledge. In the present system of technical and vocational education, theoretical learning and some practical skills are obtained in institutions, mostly in the recently renamed TVET colleges, while job specific training occurs through prescribed periods of work placement.



In light of common assumptions about the value of workplace learning, this research was concerned with exploring whether, and how such learning is taking place. It sought to understand the methodologies, practices, and affordances available to learning in the workplace, from the perspective of candidate apprenticeship/learnership students. To this end this study employed a qualitative approach for investigating how candidates experienced and interacted with the ‘real world environment’ of the workplace. Semi-structured interviews were conducted with a purposively selected sample comprising candidates engaged in programmes that necessitated a workplace learning component, namely, the apprenticeship and learnership in fitting and turning, motor/diesel and the auto electrical trades.

Data analysis was undertaken using both Atlas ti software and manual methods for coding and identification of themes. Lenses used to describe and explain learning in the workplace included the conceptual frameworks of Engestrom's (1987) Activity theory; Vygotsky's (1978) notion of learning via the 'expert other' within a Zone of Proximal Development; and Lave and Wenger's (1991) theorising of situated learning in Communities of Practice. This triangular juxtaposition of complementary theories formed a richly informative explanatory system for my further exploration.

As a qualified artisan myself I was familiar with the negative connotations of a historical 'sit by Nellie' approach, a phrase used to caricature the way apprentices learned in the past, by simply being passive observers of the experts. However, my findings were to reveal a vastly different picture of learning in this modern, visual and tactile age. Learners in this study experienced a range of learning modalities, methodologies and affordances that were reported in 'thick' descriptions, building a vivid picture of engagement and interaction. In addition to the abundance of learning opportunities candidates experienced, their responses revealed the indisputably central role played by 'expert others' in moving them towards competence – the expert artisan emerging as the quintessential didactic practitioner. This thesis proceeds to highlight the experiences of candidates on their learning journey in the workplace, and suggests recommendations in respect of these. Key learnings are distilled, which ultimately point to the need for collective effort in appreciating and retaining for the benefit of future generations of artisans, the mentoring potential that exists in our expert artisans wherever they may be found.

ACKNOWLEDGEMENTS

In my childhood days in the early sixties on the dusty, windy and sandy spaces of the Cape Flats, under severe financial constraints and injustices suffered by the family as a result of the Group Areas Act, I vowed that I would take the route of education to try and escape some of the hardship and poverty. Thus the journey towards the completion of this education project has been long and tough, and I hereby wish to thank our Heavenly Father for his love, grace and patience on the road to the fulfilment of a dream. There are a few people I must acknowledge for their role in helping and supporting me on this journey.

I wish to thank:

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- My respondents, the candidates whose perceptions played such an important role in this study, who shared their thoughts and experiences openly and honestly.
- Mr Selwyn Scholtz and his colleagues from the City of Cape Town who gave me access to some respondents in this study and access to their premises to interview the candidates.
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- My wife, Angela and my children, who sacrificed much and gave me space and encouragement when I was working on this project;

And last but not least:

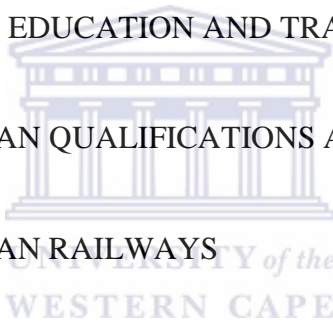
I wish to dedicate this research to the memory of my late mother Anne Catherine Vollenhoven who was the great inspiration in my life, thank you Mom.



ABBREVIATIONS

AATP:	ACCELERATED ARTISAN TRAINING PROGRAMME
ATRAMI	ARTISAN TRAINING RECOGNITION AGREEMENT FOR METAL INDUSTRY
CBMT:	COMPETENCY BASED MODULAR TRAINING
CHAT:	CULTURAL HISTORICAL ACTIVITY THEORY
COP:	COMMUNITY OF PRACTICE
DHET:	DEPARTMENT OF HIGHER EDUCATION AND TRAINING
DOE:	DEPARTMENT OF EDUCATION
ESKOM:	ENERGY SUPPLY COMMISSION (English translation)
HRDS:	HUMAN RESOURCE DEVELOPMENT STRATEGY
HSRC:	HUMAN SCIENCES RESEARCH COUNCIL
ISCOR:	IRON AND STEEL CORPORATION
MA:	MODERN APPRENTICESHIPS
MERSETA:	METAL ENGINEERING AND RELATED SERVICES SECTOR EDUCATION AND TRAINING AUTHORITY

NATED:	NATIONAL ACCREDITED TECHNICAL EDUCATION DIPLOMA
NDP:	NATIONAL DEVELOPMENT PLAN
NGP:	NEW GROWTH PATH
NSDS 3:	NATIONAL SKILLS DEVELOPMENT STRATEGY (Third)
NTB:	NATIONAL TRAINING BOARD
NQF:	NATIONAL QUALIFICATIONS FRAMEWORK
PSET:	POST SCHOOL EDUCATION AND TRAINING
SAQA:	SOUTH AFRICAN QUALIFICATIONS AUTHORITY
SAR:	SOUTH AFRICAN RAILWAYS
SDA:	SKILLS DEVELOPMENT ACT
SIPS:	STRATEGIC INFRASTRUCTURE PROJECTS
TVET:	TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING
WL:	WORKPLACE LEARNING

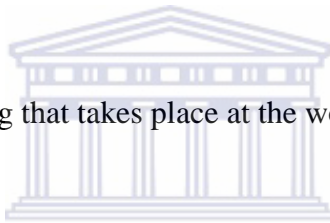


KEYWORDS

Learnership: The combination of structured workplace learning under the supervision of a qualified artisan, and related structured institutional learning, that leads to a qualification registered on the National Qualifications Framework (NQF).

Apprenticeship: The combination of structured workplace learning under the supervision of a qualified artisan, and related structured institutional learning in terms of official National Accredited Technical Education Diploma (Nated/'N' courses) Report 191 programmes.

Workplace Learning: Learning that takes place at the work site



Institutional Learning: Learning that takes place at a formal institution such as a TVET college or other learning provider

Workplace Competence: The skillful performance of a task in an authentic work context

Applied Competence: Integration of knowledge, skills, attitudes and applications performed in context

Occupational Competence: Integration of knowledge, skills, attitudes and applications performed within a specific occupation in a workplace

Situated Learning: Learning that takes place in situations in the workplace

Tacit Knowledge: Practical or workplace knowledge (also referred to as informal)

Propositional knowledge: Declared or explicit knowledge (or formal)

Pedagogy: Methodology of teaching and learning

Craftsman: Highly skilled artisan

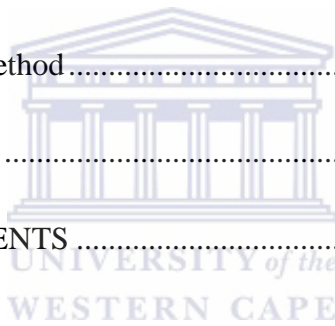


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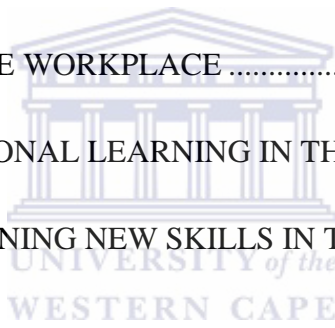
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CHAPTER 1: INTRODUCTION AND BACKGROUND

Apprenticeship offers a way of conceptualising learning that does not separate it from the production of knowledge or tie it to a particular context. It can therefore be the basis of a more general theory of learning that might link learning at work and learning in classrooms, rather than see them as distinct contexts with distinct outcomes (Guile & Young, 1991: 111-112).

1.1 BACKGROUND

It is significant to note that the etymology of the word ‘apprentice’ is to be found in the Middle English and Old French word ‘aprentis’ which in turn comes from ‘apprendre’, meaning ‘to learn’ (HSRC, 2008b, p.140), hence apprenticeship has historically been associated with learning within a workplace context, which is a central concern of this thesis. The learnership was introduced as a model of workplace training in South Africa under the Skills Development Act 97 of 1998 but the concept of learnership can be traced to the Modern Apprenticeship model that originated in the United Kingdom in the early 1990’s.

Although there are some programmatic differences between the apprenticeship and the learnership in South Africa (for instance apprenticeship applies mainly to traditional ‘hard’ trades whereas learnership applies to a wider range of occupations), both models involve the combination of theory and practical training (Vollenhoven, 2007), a prescribed period of contracted indentureship within the relevant industry, and culminate in a trade test as applicable to that industry. Therefore, in this thesis, the term ‘learnership’ is used to describe

both learnership and apprenticeship candidates involved in structured institutional and workplace learning that can lead to artisanship. Appendix M hereto corroborates that under recent South African policy “a ‘learner’ includes an apprentice, and a ‘learnership’ includes an apprenticeship” (see Skills Development Act, Act 97 of 1998).

Apprenticeship in South Africa owes its origins largely to the development of the mining and railway systems during the discovery of gold in the mid-1800s (Union of South Africa, 1935). The need for skilled labour became evident at this time, leading to craftsmen and skilled artisans emigrating from Britain to South Africa to fill the ‘skills gap’. In the early British apprenticeship system apprentices learned their craft by observing and watching ‘skilled artisans’ and ‘master craftsmen’ at work. In time, these apprentices were allowed to perform the observed tasks on their own under the watchful eye of the master craftsman. Apprentices were required to attend theoretical classes at a technical college on a day-release system during the course of the year, but it was not compulsory to do so. At the end of the contract the apprentice qualified as an artisan. Compulsory trade testing did not exist at that time and the state played a minimal role in the regulation of training. It was thus left to employers and craft unions to shape the system of apprenticeship (Lundall, 1997).

In the South African apprenticeship system however, the state chose to legislate and play a regulatory role in South Africa through the Apprenticeship Act of 1922 (Lundall, 1997). This legislation acted as a buffer which “excluded the participation on equal terms of cheaper black labour from the economy” (ibid., 1997, p.5). Furthermore, the apprenticeship system as implemented in apartheid South Africa after 1948 denied many people the opportunity to be

indentured as apprentices on the basis of race. The provision of training was divided by a separate funding model for ‘black’ and ‘white’¹ colleges (DoE, 2001). According to Gamble (2003) it was not the Apprenticeship Act of 1922 that directly excluded blacks from entering an apprenticeship, instead it was some of the criteria set out in the Act, for example, the high level of education required and the compulsory attendance at a trade school of which only a few existed for blacks. Throughout the 1920s and 1930s the theoretical component of the apprenticeship system was offered by state-owned enterprises including South African Railways (now called Transnet), Post and Telecommunications (Telkom), Eskom, Iscor, and by public technical colleges (DoE, 2001), to train white apprentices in South Africa.

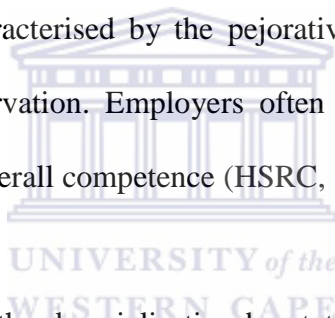
Apprenticeships were offered in trades such as carpentry, motor mechanics, spray-painting, fitting and turning, plumbing, boiler making and electrical. Initially the apprenticeship system only included national certificates for theory at levels N1 to N3 (official National Education theory programmes), which theory was often unrelated to the practical training (Kraak, 2004). According to McGrath (1998) the provision of technical and vocational education and training (TVET) in South Africa was to a large extent shaped by the belief that other racial groups in South Africa did not possess the “intellectual capacity to be trained at higher levels” (Badroodien & Kallaway, 2003/4, p.7).

During the 1970s the government’s industrial decentralisation policies encouraged employers to train more black workers though they were still prohibited from being accepted into formal apprenticeships (DoE, 2001). In 1981, with the promulgation of the Manpower Training Act,

¹ These terms of racial classification were created by the apartheid South African government. Their use in this thesis is merely for explanatory purposes, and in no way implies acceptance of such classification.

blacks were formally accepted into the apprenticeship system and could move from being simply ‘tool boys’ and ‘artisan aides’ (Potgieter, 2003).

Apprenticeship entailed signing a contract with an employer for a period of between three to four years and was trade-specific. Theoretical study was undertaken for periods of three months of the year called ‘block-release’ at a technical college (HSRC, 1984). Some of the shortcomings of the National Training Board’s (NTB’s) apprenticeships included lack of resources and training ‘know-how’ that led in some cases to inferior quality artisans. Candidates’ training in the workplace was thus largely unsupervised, uncoordinated and to a large extent unstructured, characterised by the pejorative term ‘sit-by-Nellie’², to refer to learning simply through observation. Employers often used apprentices as cheap labour, thereby not developing their overall competence (HSRC, 1984).



According to Gamble (2003), the deracialisation by statute of apprenticeships in 1981 saw the decline in work-based educational routes. At the beginning of the 1980’s artisan employment in the economy was approximately 170 000 (Mohamed & Kimmie, 1992, cited in Lundall, 1997). In the mid-1980s this figure declined to just under 12 500 and in the early-1990s it declined even further to a low of 10 000 (South African Labour Statistics, 1992, cited in Lundall, 1997). Towards the end of the 1990s the number of new apprenticeship contracts was 3129 (Bird, 2001). The deliberate prevention of black labour performing

²Also referred to as ‘sitting-with-Nellie’, this expression derives from the UK and was commonly used to refer to a teaching approach where the apprentice was required only to observe the expert and implement later on the basis of his/her observation.

skilled jobs stunted the country's economic growth because there were not enough skilled white workers to fill existing vacancies (Lundall, 1997).

The 1998 Skills Development Act demanded that learnerships link formal theoretical learning at an accredited TVET college to learning in the workplace, and that both institutional formal learning and on-the-job training should lead to a registered qualification on the NQF. The Act also stated that both the formal and informal training components should be structured and goal-directed (DoL, 1997), and that learnerships should result in occupational competence. However, theory and practice in the previous apprenticeship system were often unrelated, to the extent that theory learned in the college was seldom if ever applied in the workplace. Similarly, while workplace learning is seen as an important aspect of the learnership today, the combination of workplace experience and formal college learning does not guarantee the integration of theoretical knowledge and practical experiences (Hardy & Menard, 2004). This, then, is the background against which the central focus of this thesis is situated.

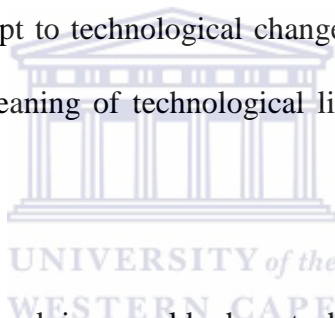
1.2 STATEMENT OF THE PROBLEM: A RATIONALE FOR THIS STUDY

Since the inception of democracy South Africa has become part of a globally competitive economic arena where highly skilled workers capable of engaging with new technology in a changing environment, are increasingly required (Bhyat, 2011; Noon & Blyton, 2007). This environment calls for innovation from highly skilled workers “capable of adapting existing technology through incremental innovative steps” (Bhyat, 2011:5). Furthermore Kraak (1997) holds that:

Continuous innovation is highly dependent on the presence of two knowledge forms in society and work: an abundance of formal (scientific and technological) knowledge and skilled worker 'know-how' or tacit knowledge (p.54).

(Gleeson, 1990:197) adds that:

Skills are not entities which are in short supply. What industries need are people with the abilities to develop new skills to learn new knowledge, to acquire new concepts and theories and to adapt to technological change with enthusiasm and lack of fear. This is the essential meaning of technological literacy as opposed to technological skill.



These are the new realities of work in a world where technology changes constantly demand new or modified expertise, skills and attitudes among both management and staff (Boud & Garrick, 1999; Casey, 1999). Casey argues that "every aspect of work, from its practical everyday organisation, its form and function in production and economy, to its meaning and value in individual and collective life, are affected by these changes" (1999:15).

The worker in a post-Fordism economy as described above requires a high level of conceptual and cognitive knowledge and skills. Guile and Young (1991) aver that a reconceptualisation of the apprenticeship model of workplace learning requires re-thinking the modes of learning or methodologies of teaching and learning in ways that Mjelde (1993)

alludes to as “a pedagogy that surmounts the contradictions between intellectual and manual labour”. Engestrom (1994) in Fuller & Unwin, 1998:159) clarifies the link between learning and modern work organisation or production issues. He argues that:

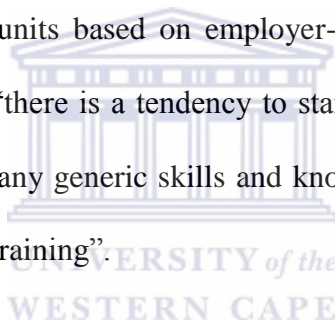
Although there are many occasions of productive learning in everyday situations, most of everyday learning consists of conditioning, imitation and trial and error. Investigative deep level learning is relatively rare without instruction or intentional self-instruction. For that very reason, instruction is necessary. Its task is to enhance the quality of learning, to make it purposeful and methodical.

According to Vygotsky, learners use their everyday experience as a context to ‘make sense of scientific concepts’ in a formal curriculum. He argues that this might happen during learners’ interaction with others in various situations but acknowledges that learners might need assistance in understanding the deeper conceptual knowledge that underpins practice or in unlocking ‘innovative’ ideas, hence introducing the notion of the ‘expert other’.

Despite contestations, research has shown that theory and practical integration are key to raising competency levels (Bereiter & Scardamalia, 1993; Martinez & Badaux, 1994). It is posited that strengthening the knowledge-practice relationship through learning in the workplace (Vygotsky, 1978 and Engestrom, 1994) might lead to the kind of en-skilling required in the post Fordist economy, but how does this learning take place, indeed, how should this take place? While the ‘situative’ nature of learning in the workplace creates

opportunities for learning, Greeno (1997) cautions that it could also limit the quality of the learning, depending on what can be learned and how it is to be learned.

Meghnagi (2004) holds that competence may arise out of knowledge and skill acquired through practice, defining competence as, "... an undivided complex of knowledge, abilities, ideas and ways of doing things that make it possible to carry out an occupation" (p. 62). However, both Spours (1988:13-14) and Kraak (1994:302) argue that Competency Based Modular Education and Training Systems (CBMT) which are practice based, often perpetuate a narrow Taylorist process of en-skilling because "they lend themselves to the development of discrete skill units based on employer-defined standards of competence". Bhyat, (2011: 69) agrees that "there is a tendency to standardise work-based competencies, resulting in the exclusion of many generic skills and knowledge essential for progression to higher levels of education and training".



The influence of technology such as social media, e-learning , global competitiveness, trade in the market economy, increased customer demands and the skills requirements of employees in most occupations have put pressure on, and changed the context in which work is performed globally (Noon & Blyton, 2007). In order for workplaces to survive in the new global economy, they need to be competitive and innovative, which calls for new and modified competencies. Boud (1999:5) explains as follows:

Workplace learning is concerned not only with immediate work competencies, but about future competencies. It is about investment in the general capabilities of

employees as well as the specific and technical. And it is about the utilisation of their knowledge and capabilities wherever they might be needed in place and time.

Mulder et al (2006) cautions that the behaviourist approach to competency emphasises the importance of how well an individual can perform a task and is based on characteristics such as demonstration, observation and assessment of behaviour. On the other hand, Guile and Young (2002) aver that a reconceptualisation of apprenticeships as a model for workplace learning requires re-thinking the modes of learning or methodologies of teaching and learning in ways that “surmount the contradictions between intellectual and manual labour” (Mjelde, 1993). To amplify, Fuller & Unwin (1998:169) identify features of such a reconceptualised apprenticeship which could include:

- Creating educative environments on and off-the-job (access to authentic tasks, plentiful interactions, integration of on and off-the-job learning experiences);
- and
- Recognising the centrality of pedagogy (conceived broadly) in apprenticeship development.

What this brief introduction to the domain of skills development illustrates is the variety of scholarly perspectives and critiques on the ‘what’ and the ‘how’ of workplace training, often from a macro-economic or employment perspective. Having taken the apprenticeship route myself, my learning experience in the workplace consisted predominantly of observation, asking questions and then doing the work independently. I often complained to management that I was receiving little or no guidance, and that my learning was mainly through trial and

error. Experts were not readily available to assist since they had their own production schedules, which seemed to be the experience shared by many of my peers at the time as well.

However, it was only as I came to reflect on this learning in my current role as TVET curriculum adviser, that I began to take a keen interest in the nature of learning in the workplace. Given that some thirty years had passed since my own apprenticeship, and technologies had advanced apace, I wanted to explore whether things had changed since my own apprenticeship so many years ago. More particularly, I wanted to understand how the candidates themselves were experiencing the workplace, and obtain their perspectives on how they were learning and developing their skills. In my preliminary reading I found a lacuna in the local research on this issue, while policy discussions seemed to dominate the past decade given that TVET was (is) in a particularly transformative space in the country.

By investigating how learnership candidates in their own understandings relate theory to practice in their day-to-day activities in the workplace and develop competence, this thesis intends to contribute towards the general body of knowledge on vocational learning, and more particularly to shine a light on what in South Africa is still only vaguely referred to as ‘workplace learning’. Thus my study is concerned with the opportunities for learning in the workplace, the nature of the situated learning process, and the modalities by which learning occurs.

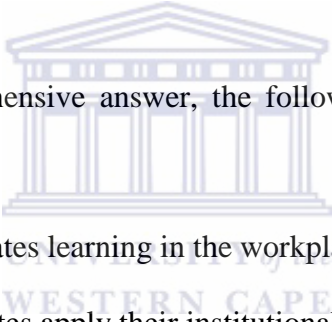
1.3 AIMS AND OBJECTIVES OF THIS STUDY

The aim of this research is to understand how college learners experience learning in the workplace and whether they are, in their own view, acquiring occupational competence as intended in learnership policy.

The specific overarching research question therefore asks:

How do TVET College learners experience learning in the workplace and what learning opportunities are afforded them in the workplace that build their occupational competence?

In order to provide a comprehensive answer, the following sub-questions emanated as a guide to my investigation:

- 
- How are college candidates learning in the workplace?
 - How do college candidates apply their institutional learning in the workplace? and
 - What learning opportunities are afforded them towards building occupational competence?

I envisaged that attempting to answer these questions from the candidates' perspectives would contribute another window onto the workplace learning environment and further elucidate its role in building the occupational competence of vocational college learners. The questions set out above were returned to throughout the progress of the research and provided a crucial road map along the way.

1.4 OUTLINE OF THE THESIS

Chapter One provides an introduction and background to the dissertation, setting out a rationale for the research question and sub-questions. Chapter One also sketches an overview of the various parts of the thesis as described below.

In Chapter Two, contextual detail is provided on the learnership model in South Africa, and the roles of the learning institution and the workplace in providing training for prospective artisans in the fields of Engineering, particularly students of automotive industries. Key aspects of policies relevant to skills development in the TVET college sector are highlighted in this section.



Chapter Three explores the relationship between work and learning through a literature review that focuses on the theory-practice relationship and knowledge application in the workplace. Concerns about traditional modes of learning and contestations around the nature of workplace learning are highlighted.

In Chapter Four a theoretical framework for this study is outlined. The central research concern relating to learning in the workplace is problematised within complementary conceptual frameworks such as Engestrom's (1987) activity theory; Vygotsky's (1978) notion of the 'expert other' in the Zone of Proximal Development; and Lave and Wenger's(1991) theorising around situated learning in communities of practice. Set within a socio-cultural paradigm, these perspectives highlight the importance of context, culture and

the social aspects of learning, but place differing emphases on how learning might occur in the workplace. They concur though, that in order to learn, learners have to inter alia engage socially with their workplace peers, with expert others, and be involved in physical, goal-directed activities with various artifacts (Engestrom, 1987; Vygotsky, 1978; Nardi, 1996).

Chapter Five sets out the research design, including a rationale for selecting a qualitative research methodology. A qualitative approach is used as the vehicle for studying how learners experience and interact with the real world environment in the workplace (Duffy, 1987). The purposively selected sample comprises three groups of ten learners engaged in programmes that prescribe a workplace learning component, namely, the apprenticeship and learnership in fitting and turning, motor/diesel and the auto electrical trades. A total of 30 candidates were interviewed, with interviews conducted at the premises of a large public TVET college, at a Training Academy linked to a number of motor vehicle franchises, and at an industry training centre. Interviews were audio recorded and transcribed for analysis. In addition, candidates were asked to record their incidents of learning in a ‘critical incident’ log book. Data analysis employed both Atlas ti software and manual methods for coding and identification of themes.

Chapter Six, on findings, sets out the evidence gathered in terms of each of the sub- questions that aggregate towards the main research question, and the data is then expounded upon, detailing the emergent themes generated by the interview schedule and guided by the sub- questions in this research. The perspectives of the candidates are given voice through extracts from the data which support the themes that have been drawn out.

In Chapter Seven, a discussion of the findings is conducted within the context of the literature on workplace learning as well as the theoretical underpinnings of the study. This chapter relates candidates' learning experiences in the workplace with reference to neo-Vygotskian and developing socio-cognitive theories of learning. The discussion of the data problematises the ways in which learners currently learn in the workplace and the opportunities for learning afforded to them, which are shown to be many and varied. The centrality of the role of the expert vis-à-vis other learning affordances emerges strongly from the evidence, in spite of misgivings generally held that modern day apprentices' workplace experiences may still be limited to a 'sit-by-nellie' approach.

Finally, Chapter Eight distils some of the central learnings of the research and the implications of these for practice and for future research, and offers tentative recommendations on the basis of this study. The following chapter proceeds to outline a brief context of skills development in South Africa, its institutions of learning and the policy environment pertaining to workplace learning as a prerequisite for qualification in learnerships and apprenticeships.

CHAPTER 2: THE CONTEXT OF SKILLS DEVELOPMENT IN SOUTH AFRICA

2.1 INTRODUCTION

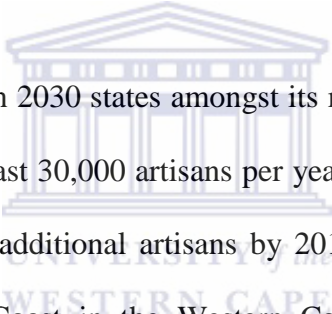
In this chapter the policy context of skills development in South Africa is outlined, and the role of TVET providers is located within this context. Official national programmes for artisan training: the learnership and the apprenticeship, are described and analysed particularly in terms of their structure with regard to their two main components: institutional learning (largely theoretical but including some practical simulation) and practical workplace training. The intention of this chapter is to enable understanding of the local vocational education and training context before moving further afield into the comparative literature.

2.2 DEVELOPING A SKILLED WORKFORCE IN SOUTH AFRICA

The availability of technically skilled labour at the intermediate level has become a critical issue in South Africa (Kraak, 2007; Von Landsberg, 2014), for example, the production of artisans for a growing economy has been identified as a priority by the Joint Initiative in Priority Skills Acquisition (JIPSA), which was launched by the government on 26 March 2006. The JIPSA initiative argued that severe shortages of artisanal labour are emerging in key technical fields.

A number of aligned national policy initiatives such as the New Growth Path (NGP, 2010), the Industrial Policy Action Plan (IPAP, 2013-2016), the Human Resource Development Strategy (HRDS) and, in particular the relevant SETA Sector Skills Plans (SSP) provide

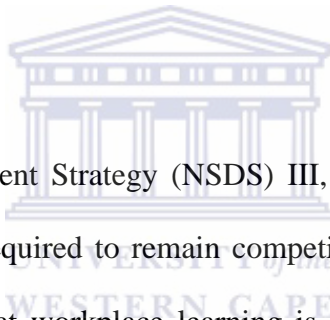
direction for skills development in South Africa. These initiatives are supported by the National Skills Development Strategy (NSDS III, 2011-2016), a strategic guide to skills development for sector skills planning. The NSDS mentions three key challenges, namely: continuing skills shortages in the artisanal, technical and professional fields that are fundamental to the development and growth of our economy; an over-emphasis on NQF level 1-3 learnerships with insufficient progression towards more appropriate (intermediate and higher) skills required for growth sectors in a knowledge economy; and, the failure of businesses in many sectors of the economy to equip their workforces to adapt to change as the economy becomes more knowledge based.



The National Development Plan 2030 states amongst its many goals that South Africa needs to produce a workforce of at least 30,000 artisans per year, whilst the New Growth Path sets an ambitious target of 50,000 additional artisans by 2015. According to a 2011 report on artisanal skills on the West Coast in the Western Cape, artisanal skills fall under the definition of ‘intermediate level skills’, which are more demanding than routine or basic vocational skills but are below professional skills, and are specific to occupational skills needed in jobs ranging from the trades to associate professional occupations.

The decline in the numbers of new artisans over the last decade exists alongside a significant expansion of TVET college enrolments in engineering at the National Certificate levels N1, N2 and N3 (levels offered in TVET colleges). However, most of these engineering students are not sponsored by employers as apprentices or trainees, and as a consequence many face unemployment once they have graduated (Kraak, 2007:1).

Within this context, the role of colleges in assisting in the development of skills in South Africa cannot be over-emphasised. TVET colleges have been mandated through the Skills Development Act of 1998 and the Further Education and Training Act of 1998 to develop the capacity to offer and manage learnerships under the relevant Sector Education and Training Authorities (SETAs). Therefore in this regard, the new institutional landscape for TVET colleges represents a significant and decisive break from the old system of technical/vocational education and training in South Africa and ushers in a new TVET college landscape that will respond to the human resource development needs of the country (DoE, 2001:1).



The National Skills Development Strategy (NSDS) III, argues that artisanal skills are not keeping pace with the skills required to remain competitive in an increasingly knowledge-based economy (p.29), and that workplace learning is an important component of formal learning at TVET colleges, hence the need for integration of knowledge and skills. The Government's National Infrastructure Plan (NIP) of 2012 identified eighteen strategic integrated projects (SIPs) which aim to address South Africa's infrastructure needs, such as construction of roads, railway systems, electricity plants, hospitals, schools and dams. Government policies note the demand for artisans in South Africa and consequently place public TVET colleges at the centre of skills development in this regard. It is therefore critical that college programmes, in particular learnerships and apprenticeships, adequately prepare candidates for the workplace. According to Kraak (2007:1), 'this paradox of artisanal shortages alongside a surplus of unemployed engineering college graduates, is exacerbated

by the dramatic growth in the number of learners who have enrolled in learnerships since April 2001', the date which signalled the start of government's flagship National Skills Development Strategy (DoL, 2001). Kraak (ibid:19) concurs that 'the most important innovation in the intermediate skills development arena in the post-apartheid era is the learnership'.

The Skills Development Act of 1998 sought to overcome the problems associated with the old apartheid regime's training programmes through the creation of an institutional framework with strong links forged among learners, employers, government and the new intermediary training bodies the SETAs. Within this framework, the learnership was proposed as a new model for delivering training .The Skills Development Act of 1998 refers to the learnership as having a three-fold purpose: firstly, it is aimed at providing workplace learning in a more structured and systematic form through formal learning at an accredited education and training provider (for example, a public or private college or university of technology); secondly, learnerships seek to link structured learning to multiple sites of workplace experience, with Learnership Agreements drawn up between the employer, the education provider and the learner, specifying the conditions of employment, practical work experience, and when the learner should be released to attend training classes; and finally, theoretical training and practical work experience should culminate in a nationally recognised qualification (DoL, 1997:3).

2.3 LEARNERSHIPS AND APPRENTICESHIPS AS ROUTES TO ARTISANSHIP

The learnership as stated earlier is a model of artisan training in South Africa. The comparative literature on skills development however refers to other models that combine theoretical and workplace training as apprenticeships, a term used globally. How does the apprenticeship and learnership as models of workplace training compare? According to Brunello & Medio (2001) assigning meanings to concepts like apprenticeship and learnership might differ because of particular institutional and cultural differences that exist across contexts. Both the learnership and the apprenticeship are structured around two components, namely institutional learning and workplace training. As workplace training is a key component of both models there is a strong link to the world of work (De Jager et al, 2002). Unlike apprenticeships which apply to selected trades though, learnerships can be offered as programmes of learning towards any occupation. Furthermore, a learnership must culminate in a qualification registered by the South African Qualifications Authority (SAQA) on to the National Qualifications Framework (NQF).

The apprenticeship system historically had a weak linkage between theoretical training and work experience, with each site of delivery (theory and practice) having minimal interaction between them. Theoretical training was often unrelated to the practical training of the apprentice, and little supervision or structured induction into skilled work at the apprentices' place of employment was undertaken. In the traditional apprenticeship, as with the later learnership though, candidates are bound by contractual agreement and according to the Manpower Training Act (56 of 1981) there must be an agreement concluded between the apprentice, the employer and the training provider. An apprentice is bound by contract for the

duration of the apprenticeship and during that time receives theoretical training of up to three months (block release) at a designated training provider such as a TVET college, and has to obtain a N2 certificate comprising four technical subjects in order to undergo the trade test.

There are several routes to becoming an artisan: Before the expiry of the contractual period the apprentice undergoes a trade test and, upon successful completion of the trade test the apprentice is released from the contract, called a Section 13 apprenticeship. A Section 21 apprentice on the other hand, finishes his time without doing a qualifying trade test, and achieves artisanship by a route known as 'effluxion of time' (see below). There is also a provision, Section 28, where a worker with a number of years' experience (see explanation below under Section 28 candidates) may undertake a trade test after a Recognition of Prior Learning (RPL) process. Another way of qualifying as an artisan is by way of the Artisan Training Recognition Agreement for Metal Industry (ATRAMI), where after a number of years of service in the same industry (engineering or motor) recognition is given by the relevant union and a worker is deemed qualified without having to do a qualifying trade test. In order to fast-track apprenticeship training, an accelerated apprenticeship is being offered currently, where a learner enters the apprenticeship with the required theory subjects and therefore does not have to attend block-release theory sessions at a training provider. Many unemployed learners enter the TVET college, complete their Competency Based Modular Training (CBMT) phases 1 to 4, and then enter into an apprenticeship contract towards becoming an artisan.

Theoretical training for most artisan trades consists of the official NATED curricula delivered by public and private accredited colleges, with the N2 certificate being the required level of theory for taking the trade test. Public colleges are deemed accredited to offer the theory component which has a prescribed syllabus and assessment regime, and do not undergo the formal accreditation process which private colleges are compelled to do.

Artisan status is acquired after passing the requisite trade test. Learnerships, as distinct from apprenticeships however, do not build into the programme the provision to undergo the trade test, with the result that the qualifying authority (in this case the MERSETA) receives a considerable number of applications for trade testing by persons who have successfully completed trade related learnerships. However, the Manpower Training Act of 1981 makes provision for the Training Board to approve trade testing of trainees who have undergone training at an accredited centre and they are thus exempted from the N2 certificate requirement. The sections below expand further on the routes by which candidates may achieve qualified artisan status.

2.3.1 Competency Based Modular Training (CBMT) System

Candidates who undertake the Competency Based Modular Training route to artisanship, have to enter with the minimum of a Grade 11 certificate (technical or academic), including Mathematics and Science. These apprentices are exempted from the N2 certificate requirement because the trade theory component will be covered within the CBMT programme. Although the CBMT model of training is critiqued in some circles as a ‘narrow’ approach to enskilling, it holds distinct advantages for the employer and the workplace. First,

the CBMT programme focuses on the product rather than the process, which is in line with the emphasis on performance outcomes in the workplace. Second, the model suits production requirements where standards are set by the particular industry, and is therefore ‘employment led’, and third, the CBMT model has a strong practical orientation that assists learners in the acquisition and mastery of skills. Regarding its curricula, the training is broken down into smaller units or elements of competence whereby apprentices are assessed on modules completed, and are evaluated against specific criteria. After completion of each of the four phases of training, the apprentice returns to the workplace to underscore and practice the institutional CBMT training. Successful completion of Phase 4 means that the apprentice is eligible to undergo the trade test (See Annexure K hereto).

2.3.2 Time-Based Apprenticeship System (Section 21 candidates)

To apply for a trade test in terms of the Time Based System, also known as Section 21 apprenticeship, candidates require a minimum of Grade 11 (technical or academic) inclusive of a Trade subject. Exemption from the N2 certificate requirement is given to indentured apprentices if they possess the relevant trade theory subject, skills programme registered by the MERSETA, or higher technical qualifications that cover the relevant theory. Candidates serve the prescribed apprenticeship period and are then certified as qualified artisans without having to pass the Trade Test.

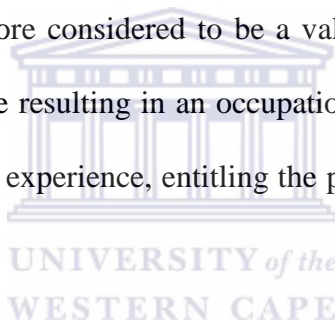
2.3.3 Section 28 Apprenticeship candidates

Exemption of the N2 certificate requirement is afforded applicants in possession of proof of between four and six years’ appropriate on-the-job experience, depending on the level of

relevant trade theory that they have acquired. This route serves as a Recognition of Prior Learning route for candidates who might have long trade experience without formal qualifications and who desire to obtain the Trade Test certification.

2.3.4 Learnership candidates

Based on the matching of trades against associated learnership levels the MERSETA has given approval for candidates who successfully complete Levels 2, 3 and 4 in a trade-related learnership to be permitted to undergo Section 28 trade testing if they have a minimum of three (3) years' experience, which includes on-the-job and institutional training. A completed learnership in a trade is therefore considered to be a valid route to artisanship since it is a recognized learning programme resulting in an occupational or vocational qualification, and is inclusive of prescribed work experience, entitling the person to undergo the relevant trade test.



2.3.5 Structure of the learnership

Learnerships are registered as qualifications on the National Qualifications Framework and are unit-standard based. Learners spend six months of the learnership programme at an accredited institutional provider such as a TVET College, where they receive formal instruction. Most of the learning takes place in the classroom and in a practicum/workshop environment that 'simulates' the workplace for practical activities. Learning is managed by a prescribed time-table and an outcomes-based curriculum facilitated by college lecturers and practicum/workshop instructors. Teaching methods could include the chalkboard, text-books,

computer-aided learning, videos, question and answer methods, working with machinery and artefacts, demonstrations or coaching, self-study, instruction manuals and so on.

In the classroom the lecturer takes the lead role in the process of teaching and learning although students may also work in groups, in pairs, or as individuals. Learners interact with the theoretical content in the classroom and learn about various concepts and the theory which underpins the use of, for example, hand tools, power tools or machine tools used in trade.

In the college workshop, learners engage in practical activities which are pre-arranged, planned and implemented according to the curriculum by the workshop instructor. The learners are taught various skills per learning outcome, for example, how to use hand tools, machine tools, and welding equipment. Skills taught to learners are through methods such as observations, demonstrations or coaching, whereby learners observe and listen to explanations/ feedback by their workshop instructors and peers. Learners are monitored, guided and assessed by their workshop instructors and at times by their peers. Many of the simulated workshop activities performed by the learners are done 'piecemeal' - a learner might be shown how to sharpen a drill bit, drill a hole in a piece of steel, use a particular hand tool, do a horizontal weld, all in isolation of the finished product or 'whole'. In this sense the practical activities are not integrated. As the learnership programme progresses, some of these skills are combined to produce a specific stand-alone artefact.

Formal learning in colleges has been characterised as theory divorced from practice, in situations where the skills acquired in the formal learning cannot be easily applied in the ‘real world’, which some scholars describe as learning ‘devoid of context’. After completion of formal learning at the TVET College, the learner moves into the authentic workplace environment and “takes with them knowledge and practices, hidden competencies or tacit knowledge from their previous learning experiences that could be re-contextualised, and find connections between prior experiences and the affordances and the constraints of new kinds of working environments” (Evans, 2004, p.10).

The role of the lecturer/trainer is to provide the candidate with training in accordance with the prescribed MERSETA schedules, and the candidate is assessed according to the criteria as per schedule. The candidate has to sign off all the modules that were successfully completed during the phase training and after completion s/he may apply for a trade test subject to the criteria mentioned earlier herein.

The candidate may choose to do a trade test orientation of up to one month first. After the successful completion of the trade test s/he is deemed a fully qualified artisan and is awarded a trade diploma from the relevant SETA.

2.4 SUMMARY

This chapter outlined the policy context of skills development in South Africa, with particular reference to the routes for qualifying as an artisan, and the learning programmes required in that regard. While the learnership was intended to replace the traditional

apprenticeship model of artisan training in South Africa, this has not occurred, and they now co-exist with little to distinguish one from the other except for some programmatic differences (see Appendix M, a communiqué from the Department of Higher Education and Training in this regard). In the chapter that follows, I explore the extant literature on artisan training and learning in the workplace, drawing largely on international contexts where apprenticeship, or the so-called ‘modern apprenticeship’ is the route to artisanship. The international knowledge base on learning in the workplace, which is the central concern of this thesis, is considerably broader and deeper than the local knowledge repository which is still in its infancy.



CHAPTER 3: LITERATURE REVIEW

3.1 INTRODUCTION

In this chapter, the nature of training in the workplace by apprenticeship in international contexts which has parallels with the learnership/apprenticeship model in South Africa, is explored. This literature review endeavors particularly to scope the knowledge base on learning and competence in the workplace, and on the training of competent artisans. In so doing, contestations around knowledge construction, notions of competence and modes of workplace learning are interrogated, as these emerged as three thematic concentrations of scholarship within the literature. Nonetheless, this thesis does not intend to become trapped within the often circuitous and seemingly endless intellectual debates about the most important type of knowledge for vocational learning, which tend to pit foundational disciplinary knowledge against practical knowledge gained in the workplace. In a recent study which traced some of the major arguments around vocational knowledge, Bathmaker (2013) illustrates that such matters are far from decided, and that in spite of a major review of vocational qualifications by Wolf (2011), key stakeholders in the UK vocational system still hold diverse interpretations of desired 'knowledges' for vocational preparation.

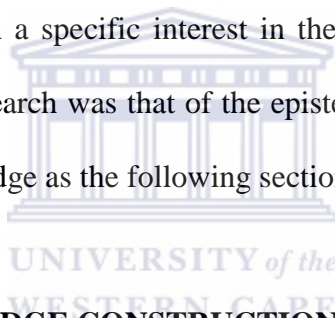
This literature review is therefore focused on learning/knowledge in relation to an occupation or the workplace, rather than a more general vocational orientation. My thesis at a basic level accepts that all practice is underpinned by theory, and that theory has to find expression in practice. It is the complementary relationship between institutional learning and workplace learning as an 'authentic' context that comes under scrutiny here, and how that learning in

the latter context is acquired. In the process of this investigation though, the underlying academic discourse and debates that frame it are set forth and acknowledged.

Fuller and Unwin (1998) conceive of apprenticeships as having three broad and inter-related dimensions. First, there is the contractual framework (see illustrative annexures hereto) within which the apprenticeship operates and which concerns the “reciprocal rights and obligations between employer and trainee” that are specified in a formal agreement (Gospel & Fuller, 1998). Second, there are cultural and social aspects of going to, and being at, work which help socialize apprentices into workplace (and adult roles). Third are the formal and informal on and off-the-job learning experiences which are characteristic of apprenticeships in post-war Britain (Gospel, 1995). This three dimensional conception is broadly compatible with that of apprenticeships in South Africa and internationally, but it is the third dimension, the learning experience aspect, which will come under particular scrutiny in this study.

Traditional apprenticeships have often been viewed as “lacking an explicit theory of instruction and not dependent upon any formal teaching” (Coy, 1989; Scribner & Cole, 1971 in Guile & Young, 1998). As mentioned earlier herein, the South African learnership model which is based on the British Modern Apprenticeships (MA) calls for “mediation as an important component in the learning process” (Scribner & Cole, 1971 in Guile & Young, 1998:149). Lave (in Fuller & Unwin, 1998:162) argues further that learners cannot be seen as “passive recipients or as mere reproducers of mechanical skills and knowledge produced by experts”.

It is evident from the literature that multiple perspectives on the nature of vocational learning and learning in the workplace, exist. Anecdotally, where workplaces have been secured by candidates for practical experience, they have been critiqued as falling short of an optimum learning environment for vocational students, due inter alia to inadequate mentorship and learning opportunities being provided. However, only few empirical studies, particularly in South Africa, have attempted to understand the learning that does, in fact, take place in work settings and how students experience the workplace as a learning environment towards achieving competence, hence the focus of my research on the perspective of the learners. This literature review has delved into the extant scholarship on workplace learning, its pedagogies and practices, with a specific interest in the relationship between learning and work. A major theme in this search was that of the epistemology of knowledge, specifically practical vs conceptual knowledge as the following section explains.



3.2 NOTIONS OF KNOWLEDGE CONSTRUCTION

Billett (1994:2) defines the term ‘appropriation of knowledge’ as follows:

...the individualised process of constructing meaning from socially and contextually defined knowledge, using the individual's idiosyncratic structuring of knowledge and understanding.

At the heart of competing discourses on institutional and workplace learning, are contestations about the nature of knowledge. Bernstein (1996, 1999, 2000) distinguishes between vertical and horizontal knowledge structures, where horizontal knowledge is context

specific, while vertical knowledge is independent of context. Bernstein describes horizontal discourse as follows:

It is likely to be oral, local context dependent and specific, tacit, multi-layered and contradictory across but not within context... the crucial feature is that it is segmentally organised (1999:159).

Young (2005) posits that acquiring and transmitting knowledge is the hallmark of education whether it is vocational, professional, technical or general. He distinguishes between scientific knowledge and practical knowledge, sometimes referred to as skills. He explains that both knowledge types are important but their purposes are different and the ways they are appropriated and transmitted differs. Scientific, procedural knowledge according to him refers to “efficient methods of working that have been developed over time, expressed in handbooks, rules or company–specific codes of practice” (unpaginated). According to Young (ibid) not all knowledge types are easily acquired or transmitted through workplace experience.

Workplace knowledge refers to “knowledge of how things are done” (Cohen and Bacdayan, 1994: 554) and according to Guzman (2009) has a cognitive and motor (doing) dimension. ‘Knowing’, according to Nicolini et al (2003) is the result of “social practice that involves knowledge in action situated in the historical, social and cultural context and [is] embodied in a variety of forms and media” (p.3). Its acquisition is through practical experience and has both tacit and explicit dimensions. The explicit component “is knowledge about how to do a

practical action that, although not clear and detailed, still can be either verbalised or explained through signs and drawings, including the capability to provide rational accounts of actions” (Guzman, 2009:11). He explains that “the tacit component of procedural knowledge is composed of concepts, ideas and experience that cannot be either objectivised or explained” (p.11). This type of tacit knowledge is also referred to as ‘practical consciousness’ (Giddens , 1982) and ‘knowing’ (Nicolini et al.,2003).

The mastery of practical skills in the workplace may be acquired through ‘practice’ which was defined by Argyrus and Schon (1974) as “the realisation of a set of actions developed by a person that either can or cannot be executed together with artefacts, materials and other people” (Guzman, 2009:13). Actions, according to Collins and Krush (1998), must have objectives or be goal-directed with social and cultural implications, and must make sense to the community in which the actions take place. When an action can be explained by an individual then explicit procedural knowledge has been applied (Guzman *ibid*) since explicit procedural knowledge has rules and goals (Spender, 2005). Eraut (2004), notes that practice is tacit when an individual cannot explain how the action was done.

Bhyat (2011) argues that workers in the new global economy need to be technologically skilled and technologically literate (Gleeson, 1990) and critiques narrow en-skilling processes in the workplace. Thus, learning at work requires both knowledge and skills, including a ‘device’ for its acquisition (Mjelde, 1993). This ‘device’ cannot be regarded as happening in some sort of ‘automatic’ mode; neither can it be taken for granted. Learners may learn out of situations in the presence of a community of practice (Lave,1990) however,

the learning experience might be more meaningful when learning is structured and planned, when there is mediation and structured intervention (Engestrom, 1994).

Young (2005) holds that disciplinary knowledge has to be made explicit and warns that this type of knowledge might not be found in the workplace. He argues further that while all jobs require specific knowledge, “many jobs also require knowledge involving theoretical ideas shared by a community of specialists located within disciplines” (ibid:16). Bronkhorst (2014) explains that propositional knowledge may be used in de-contextualised as well as contextualised ways depending on the degree of difficulty of the problems to be solved, but the workplace must make provision for engagement with disciplinary knowledge and practical knowledge. The traditional workplace pedagogy of imitation and copying of actions, including trial and error, (Engestrom 1994) might not be sufficient to expose the learner to deep levels of understanding. According to Young (2005), Dewey’s (1963) notion of ‘learning by doing’ remains a ‘significant or valid but small and decreasing feature of workplaces and therefore of vocational education as a whole’ (unpaginated). Young critiques learning by doing, as it is known in the workplace, for its limitations, since occupations such as engineering might require access to knowledge that cannot be acquired in the workplace. This knowledge may be ‘hidden’ in technology and has to be acquired elsewhere. Young (2005) concludes that ‘modern’ programmes of vocational education, unlike the old craft apprenticeships, can no longer be limited to workplace experience.

Young (2002) furthermore critiques workplace knowledge as restrictive in that its application has little or no meaning outside a particular context or community of practice,

and that knowledge applied in the workplace is ‘situation-specific’ (Gamble, 2003). Gamble (2004a), agrees that there is a first level of distinction between different forms of knowledge, namely those that are tied to a particular context or practical tasks called ‘context dependent’ meanings, and those that are abstract or de-contextualised. These are often distinguished between as ‘theoretical/conceptual knowledge’ and ‘practical knowledge’. Context-dependent knowledge is always tied to the ‘real world’ of human action. Practical knowledge, it can be argued, has a combination of both process and procedural knowledge.

In both learnerships and apprenticeships learners are taught drawings so that they develop the capacity to visualise in three dimensions. Drawing is used as a means of communication, where the mentor often makes a sketch to explain what needs to be done, so that what cannot be articulated in words is verbalized through drawings. Visualisation of the drawing ‘awakens’ the latent knowledge within the mind which makes it implicit or tacit (Gamble 2002). Researchers like Polanyi and Bernstein posit that tacit knowledge is not easily put into words and lies within the person acting out the performance. It is best demonstrated by procedures and actions. Knowledge creation requires an interaction between both the tacit and explicit and not through the one or the other in isolation (Nonaka et al., 2000). Hatting (2003), explains that an essential requirement for the successful completion of a learnership is the ability of learners to demonstrate applied competence, but how is the notion of competence to be explained?

According to Mestre (2002:10) the transfer of learning (often associated with competence) is the “ability to apply knowledge or procedures learned in one context to a new context”, while

Barnett (2006) is of the opinion that the transfer of learning can only happen when the contexts are similar, hence he questions whether one can really transfer what is learned. It is argued by Young (2003) and Barnett (2006) that traditional approaches to learning transfer lack the conceptual tools for theorising the association between formal and informal learning, referred to in the literature as vertical and horizontal knowledge (Bernstein, 1996). According to Young (2003) there is a 'disconnect' in the transfer of knowledge and skill from one setting to another owing to flawed or inefficient processes in attempting to affect transfer.

Schaap et al. (2012), Illeris (2004) and Poortman (2007) identify four types of knowledge development or appropriation namely: accumulation by constructing new basic concepts and patterns; assimilation by combining new with existing knowledge, accommodation and expansion; accommodation where learners re-arrange existing knowledge constructs; and, expansion process which involves higher mental processes, a complete shift or change in cognitive, affective and social way (Poortman, 2007, p.107). Furthermore, Poortman (ibid) holds that assimilation occurs the most frequently in the workplace.

Nonaka et al. (1994; 1995) identify four phases of knowledge development: socialization i.e. sharing implicit or tacit knowledge during apprenticeship training or tasks; externalization i.e. explaining tacit knowledge or attempting to articulate tacit knowledge; combination i.e. documenting explicit knowledge into procedures; and, internalization in which explicit knowledge is personalized into implicit knowledge, mainly by learning-by-doing. These four phases are interrelated in that knowledge development takes place in and between all phases (Nonaka et al., 1994 cited in Schaap et al., 2012, p.108).

3.3 KNOWLEDGE CONSTRUCTION THROUGH PROBLEM-SOLVING

Problem-solving within cognitive psychology is seen as being both routine and non-routine, which according to Billett (1994) might have implications for learning and transfer, and hence for competence.

Routine problem-solving in everyday activities, set within a particular community of practice, embeds thinking and acting in the context in which the knowledge is sourced (Ceci & Liker, 1986; Perkins & Salomon, 1989). Therefore, routine problem-solving, over time, incrementally constructs and reinforces knowledge. In non-routine problem-solving, existing knowledge is retrieved and manipulated to resolve problems that have not been encountered before. Through this process, new knowledge is appropriated through solving the problem. New knowledge created to address non-routine-problems, are the products of individuals' interpretive construction, based on circumstances of the co-construction of knowledge and individuals' previous history (von Glasersfeld, 1987; Posner, 1982). Engagement in the goal-directed activity of problem-solving over time results in the appropriation and organisation of functional knowledge, as indeed students in this study found from their experiences in the workplace.

3.4 LEARNING IN THE WORKPLACE

Everyday activities expose and provide learners access to situations that support learning, assisting individuals to learn new work-related knowledge and strengthening that learning (Billett 1993, 1994a, 1994b, 1996; Harris & Volet 1997). Billett (2000) also holds that

engagement in authentic workplace activities contributes significantly to constructing and learning new work related knowledge.

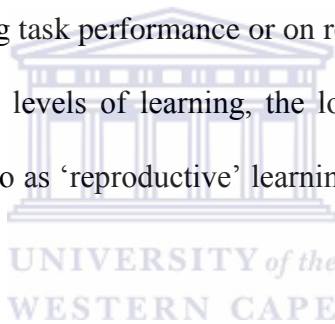
According to Avis (2004), “real learning takes place when it is acquired in the context where the resulting knowledge can be practically used” (*ibid*, 211), since there is a relationship between context, knowledge production and practice. Bagnall (1990, in Garrick, 1999:219) notes that workplace learning can be ‘accidental’ and happen ‘unconsciously’ while engaging in work activities, being recognised only after the engagement with the situation and not preceding it as in structured learning.

Available empirical evidence shows that almost two thirds of all workplace learning may be informal or incidental but is key to the acquisition of competencies for work (Leslie et al., 1998). Garrick (1998) posits that informal learning as experienced in the workplace is characterised by experiential and non-structured learning seen as participation in everyday social and working practice.

Conceptual knowledge according to Berryman (1993) is increasingly required in the workplace where ‘technological applications’ are present, since conceptual knowledge forms the basis of dealing with non-routine problems where it is required to transfer knowledge from one situation to another (Greeno, 1989; Groen & Patel, 1998; Stevenson, 1994). In order for enterprises to grow and be sustained through innovative practices, workplaces require conceptual and transferable knowledge (Billett, 2000).

Stavenga de Jong et al. (2006) in a study of vocational teaching and learning found that 29% of the learners preferred learning by doing with little reflection on prior learning and integration of theory and practice. Guided learning was another preferred method of learning (43%), applying little reflection and conceptualisation, while 28% used reflective learning where learning processes involving high levels of reflection, experimentation and self-regulation were dominant (ibid, in Schaap et al., 2012, p.106).

Jonsdottir (2007) argues that workplace learning focuses on two aspects, namely, the job itself and on the mastery of the job (p.5). Ellstrom (2001) refers to ‘single loop-learning’ where the focus is on improving task performance or on refinement of existing routines (p.5). He distinguishes between four levels of learning, the lowest level being the ‘adaptive’ or what Engestrom (2001) refers to as ‘reproductive’ learning. Ellstrom explains developmental learning as follows:



The ‘highest’ level of learning is creative learning which occurs when individuals or groups of individuals within an organisation begin to question established definitions of problems or objectives and to act to transform institutional ideologies, routines, structures or practices (Ellstrom, 2001,p.424).

This concurs with what Engestrom (2004, unpaginated) refers to as ‘expansive learning’ discussed herein below. Ellstrom (2001) however warns that adaptive and developmental modes of learning should be seen as being complementary rather than exclusive. Depending on the situation and tasks to be performed, individuals need to engage with all four types of learning in the workplace.

Engestrom (2004: unpaginated) notes that workplace learning is not static and describes it as follows:

People and organisations are all the time learning something that is not stable, not even defined or understood ahead of time. In important transformations of our personal lives and organisational practices, we must learn new forms of activity which are not yet there. They are literally learned as they are being created.

Fuller and Unwin (2003) note that expansive learning may include learners participating in various workplace settings within different communities of practice so that they reflect on differences and similarities in these situations. Developmental or expansive learning according to Jonsdottir (2007) “fosters innovative performance, changes, and even transformations at work” (p.6) or as Engeström (2004) explains:

The object of expansive learning activity is the entire activity system in which the learners are engaged. Expansive learning activity produces culturally new patterns of activity. Expansive learning at work produces new forms of work activity.

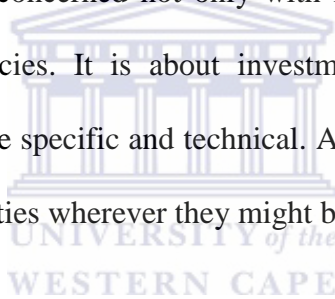
The influence of technology such as social media, global competitiveness, trade in the market place, increased customer demands and the skills requirements of employees in most occupations has put pressure on and, changed the context in which work is performed globally (Noon & Blyton, 2007). Casey (1999:15) argues that “every aspect of work, from its practical everyday organisation, its form and function in production and economy, to its

meaning and value in individual and collective life, are affected by these changes". It is assumed that such changes might include demands on the skills profiles of workers such as new skills and expertise including that of management (Boud & Garrick, 1999; Casey, 1999).

In order for firms to survive in the new global economy, they need to be competitive and innovative, which calls for new and modified competencies. An individual's employability will also depend on meeting these competency changes (Ellström, 2001; Bratton et al., 2003).

Boud (1999:5) builds upon this idea as follows:

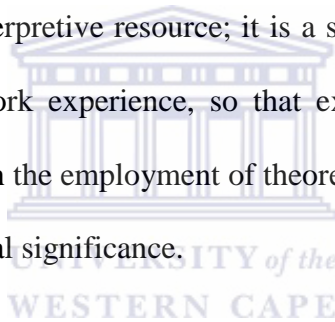
Workplace learning is concerned not only with immediate work competencies, but about future competencies. It is about investment in the general capabilities of employees as well as the specific and technical. And it is about the utilisation of their knowledge and capabilities wherever they might be needed in place and time.



Eraut (2004) holds that learning in workplaces consists predominantly of situated action, often unpredictable in nature, which makes learning unstable. Eraut (ibid) explains that the key difference between work and academic knowledge is the difference in purpose of their use and application. He notes that workplace knowledge is primarily used for en-skilling the worker to enhance productivity, innovativeness, and skills to sustain the well-being of the firm, while in the academic world knowledge is concerned with the mastery of disciplines and their (possible) application in the world. Hatting (2003) suggests that learnerships enable a structured link between education and industry in order to enhance the learner's competence in the labour market.

According to Guile & Griffiths (2001:126), "... host organisations ought to consider how they can provide environments for learning if they are to maximise the learning potential of these activities for themselves and for learners". Gott (1995) and Engestrom, (1995) respectively, hold that the effectiveness of workplace learning is enhanced when combined with formal classroom teaching, a view agreed with by Ashworth & Saxton (1990:164) as follows:

... theoretical knowledge can be merely 'detached theory', unconnected with the knower's daily life; but it can – and should – be engaged theory ... (such) ... theory plays the role of an interpretive resource; it is a system of tools with which to make sense of his or her work experience, so that experience is raised to the level of reflection partly through the employment of theoretical concepts, and theory is related to things which have real significance.



Guile & Griffiths (2001) note that separating vertical (formal) and horizontal (informal) learning, as education and training systems have traditionally done in separating theory from practice, might not be helpful. In their view, the curriculum should encourage learners to make the connection between theory and practice in the workplace. In their quest for a 'new curriculum framework' they put forward five models of workplace learning, namely, the Traditional Model, the Experimental Model, the Generic Model, the Work Process Model and the Connective Model. The 'connective model' of workplace learning has resonance for this research, because the model allows the learners not only to 'develop the capacity to participate within workplace activities and cultures', but they also learn 'how to draw upon

their formal learning and use it to interrogate workplace practices’ (Guile & Griffiths, 2001:126). Engestrom (1994:159) clarifies the link between learning and modern work organisation and argues that:

Although there are many occasions of productive learning in everyday situations, most of everyday learning consists of conditioning, imitation and trial and error. Investigative deep level learning is relatively rare without instruction or intentional self-instruction. For that very reason, instruction is necessary. Its task is to enhance the quality of learning, to make it purposeful and methodical.

High-level performance of an employee can only be determined when thinking skills, critical reflection and the transfer of knowledge are observed in the workplace (Brown & Keep, 2000). Harkin (1997 in Brown & Keep, 2000:46) clarifies this by stating that: “skills such as effective communication or problem solving can only be developed in a lengthy process of practice, in demanding and realistic situations”.

To underscore this, Fuller and Unwin (1998:158) state that:

Central to this claim is a growing belief that the distinction between formal and informal education is unhelpful because it implies the superiority of learning which takes place within educational institutions above and distinct from that which occurs in settings such as the workplace .

3.5 LEARNING IN COMMUNITIES OF PRACTICE

Wenger's (1998) theory of communities of practice may be viewed as a model of learning which takes into account learning as community; learning as identity; learning as meaning; and learning as practice. These four aspects may be useful as learning tools that provide guidance (Conole, 2008).

Lave (1990) suggests that effective learning in contemporary apprenticeships can be fostered by enabling young people to work and learn in 'communities of practice', defined as a set of relationships among persons, activity and world, over time and in relation to the tangential and overlapping communities of practice (Lave and Wenger, 1991). The primary location in which the community of practice of an apprenticeship is manifested is the workplace. However, the concept is not only defined geographically, but also by connections and relationships that are developed between its members and the activity which brings them together.

Lave and Wenger (1991) define communities of practice as follows:

Communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavor... In a nutshell: communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (p.91)

Initially people join communities and learn at the periphery but as they become more competent they become more involved in the main processes of the community, moving from legitimate peripheral participation into full participation (Lave and Wenger 1991:37). Legitimate peripheral participation according to Lave and Wenger (1991) provides a way to speak about the relationship between newcomers and old-timers, about activities, identities, artifacts, and communities of knowledge and practice. Lave and Wenger argue that “a person’s intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice. This social process, includes, indeed it subsumes, the learning of knowledgeable skills” (p. 29).

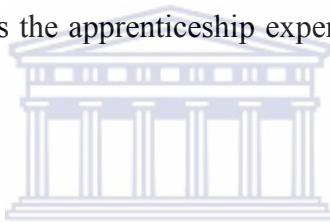
Aarkrog (2005) notes that students’ learning in workplaces happens via legitimate peripheral participation through them observing and listening to experienced colleagues and imitating their behaviour in workplaces. Aarkrog, in Schaap et al., (2012) concludes that:

legitimate peripheral participation requires full participation in vocational schools and workplaces, because some knowledge and skills can best be learned in vocational schools (e.g., knowledge of specific products or theoretical models) while other knowledge and skills can be learned more effectively in workplaces e.g. dealing with angry customers or a high workload (p.106).

Guile and Griffiths (2001) create a typology of workplace experience which critiques the notion of workplaces as static and unchanging environments. In addition, workplace learning theorists argue for the validity of the workplace as a site of learning, for a focus on the

learner as being more than the input of learning, for learning as a social practice whether in an institution or at work, and for the importance of understanding these different contexts as bases for learning progression (ibid).

From an anthropological perspective, Lave (1995) conceives learning as a natural process that occurs when individuals participate in communities, such as in the workplace. Learning is taken to be an aspect of participation in socially situated practices and as an aspect of participation in changing communities of practice (Lave, 1995). Lave's connecting learning with the notion of community contributes to a reconceptualisation of apprenticeship in at least two ways: first, it captures the apprenticeship experience from the candidates' point of view, as she observes:



Developing an identity as a member of a community and becoming knowledgeable and skillful are part of the same process, the former motivating, shaping, and giving meaning to the latter which it subsumes (Lave, 1991:4).

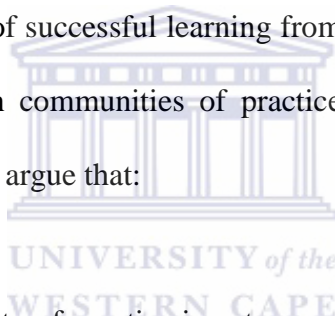
In the second instance, such a connection provides a framework in which the relationship between people and activity can be analysed, where learning can be seen as a central aspect of the relationship.

According to Fuller and Unwin (1998:159),

Lave's propositions allow us to see through new lenses the design and development of effective and innovative apprenticeship programmes. These include the rejection of

a dualism between formal and informal learning; the rejection of the transmission model of teaching and learning which portrays the learner as a passive recipient of knowledge; the recognition that new knowledge can be produced in practical as well as academic settings.

The implication of Lave's research is that people's motivation to learn is triggered when a relationship is established between what they learn and its application. This is likely to occur when individuals participate, peripherally at first, but gradually more fully in their chosen occupational field. Empirical research on this (Lave and Wenger, 1991; Lave, 1991, 1995) provides convincing evidence of successful learning from doing and interacting with a range of more experienced others in communities of practice. Other researchers like Gherardi, Nicolini and Odela (1998: 279) argue that:



Referring to a community of practice is not a way to postulate the existence of a new informal grouping or social system within the organisation, but is a way to emphasize that every practice is dependent on social processes through which it is sustained and perpetuated, and that learning takes place through the engagement in that practice.

Engestrom makes a stronger case for mediated learning though, articulating the value and necessity of formal instruction. In so doing he creates clearer links between learning, modern work organisation and production issues (see Engestrom, 1994, 1995, 1996). Much of this scholarship is based on the work of 'activity theory' psychologists such as Vygotsky, (1978)

and Leont'ev, (1978) who aver that the extent to which people learn in social situations and through interaction can be further advanced through structured teaching and learning.

Suchman (1985:21) goes further in her critique that “situated action is tied to the actions of particular circumstances and therefore...the prescriptive significance of intent, rules and knowledge for situated action is inherently vague”. She argues that situated action models of learning are vague in terms of their goals and outcomes of learning since learning is seen as embedded in the situation, with no clearly defined learning outcomes declared at the onset.

Billett (2001) critiques the perspective that workplaces are ‘informal’ learning sites and argues that learning discourses uncritically privilege formal academic education. Learning, according to Billett needs to be understood as a participatory practice which is an engagement with the social world. Billett (2001) posits that social practices whether in formal education or workplaces, are constituted historically, culturally and situationally. The learning pathways in the workplace are intentionally pedagogical, as they focus on the community of practice for learning (Billett, 2001). Billett supports Lave’s (1990) argument that work practices are often intentionally organised to facilitate knowledge acquisition for sustaining such work practice, which Lave refers to as the ‘learning curriculum’.

Engagement in workplace learning is driven by the workplace activities and its culture (Brown et al., 1989). Hodkinson (2005) concurs with Billett’s (2002) critique of formal and informal learning distinctions applied to academic and workplace learning and argues that both institutional and on-the-job learning have elements of formal and informal learning.

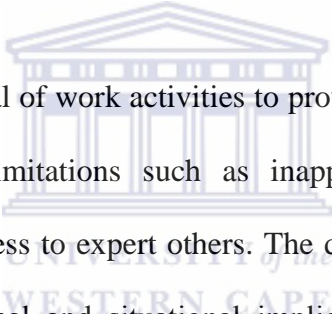
3.6 INTEGRATING THEORY AND PRACTICE

One of the concerns of this study is how the learners apply their institutional learning in the workplace. Ellstrom (2001) asserts that “in spite of a widespread belief in the importance of integrating learning and work, little is known about the conditions that promote such integration” (p.421).

Models of workplace learning in education and training systems often run the risk of separating theory and practice (Virtanen & Tynjälä, 2007). The reason could be a lack of communication between the workplace and the institution, however recent studies in vocational education have shown that theory and practical integration are ‘key’ to raising competency levels (Bereiter & Scardamalia, 1993). Schaap et al. (2012) postulates that learners often find difficulty integrating theory and practice, as integration requires complex cognitive skills that include critical reflection. They note that “workplace problems are complex, dynamic and situational in nature” (p.103) and hence, applying abstract theory and models learned in the school or college might not be easy.

However, Brown et al. (1994) posit that greater recognition has been assigned to the role of a workplace supervisor (meister) in assisting learners in finding a link between formal and workplace learning. Guile and Griffiths (2001) support the need to develop curricula frameworks which encourage links between work experience, the underlying knowledge and skills, and its context (cultural, social and technological). As Dewey (1963) observes, “in actual experience, there is never any isolated object or event” (cited in Guile & Griffiths, 2001, p.118).

Brooker et al. (1997) argue that workplace learning is fundamentally ‘situated’ and that the learning that occurs is activity bound. Furthermore, the learning experience of a learner depends on the structure of the activity and the resources available. Billett (1994) avers that effective learning in workplaces is subject to authentic activities in the presence of experts and other individuals who are engaged in planned and goal-directed tasks. He posits that skilled performances in the workplace are acquired through practice and exposure to complex tasks which will enhance learners’ problem solving skills, and that learners develop cognitive and practical skills via expert guidance in the form of coaching, modeling and scaffolding (ibid).



Billett (1995) notes the potential of work activities to provide rich opportunities for learning, however he warns against limitations such as inappropriate knowledge construction, instructional resources and access to expert others. The dynamic of workplaces as ‘learning environments’ has both personal and situational implications that have to be taken into account and their relationships need consideration (Billett, 2006).

Brooker et al., (1997) notes that learning in informal settings has gained recognition for providing authentic learning experiences, which is often not the case with formal learning. However, he cautions that situated learning could limit the knowledge and skills that are learnt, due to constraints of the pressures of production.

According to Moore (2004) learning at work is part of a naturally-occurring curriculum, but Billett (2006) explains that the curriculum needs to be goal-oriented and linked to direct

guidance from highly trained personnel like workplace mentors and trainers. Lave and Wenger (1991) are highly critical of external educators providing instruction within the workplace and hold that learning needs to happen within a community of practice as opposed to external intervention. Bhyat (2011) in his empirical study concluded that scientific or technical knowledge to underpin practice can be learned in the workplace as well, not only in the formal confines of the classroom.

Technological problem-solving according to Bronkhorst (2014) requires of learners to have an understanding of the nature of the complexities of the problem before extracting from the appropriate scientific knowledge sources that might be required to solve the problem at hand, since the everyday experiences of learners might not be easily mapped to existing scientific and pedagogical organisations of knowledge (Bronkhorst, 2014:34). According to Layton (1993), “solving a technological problem may have to be drawn from diverse areas of academic science at different levels of abstraction, and then synthesised into an effective instrumentality for the task at hand” (pp 58-59). This, Layton (ibid) says, means “building back into the situation all the complexities of real life, reversing the process of reductionism by re-contextualising knowledge”.

3.7 ACHIEVING COMPETENCE

Meghnagi (2004) notes that competence may arise out of knowledge and skills acquired through practice and defines competence as, “...an undivided complex of knowledge, abilities, ideas and ways of doing things that make it possible to carry out an occupation” (p. 62). According to Billett (2009), “...the kinds of work being undertaken, the requirements for

work, and how individuals engage in work, shape occupational practice” (p.34). To expand on this, Billett (2009) suggests that the competence required for a particular occupational practice and in a specific workplace can be elaborated through categories of work activities and interactions (ibid), and that interactions in workplaces are premised on enhanced engagement with tools and artifacts, and with others, as follows:

... apprehending what constitutes workplace competence is not so easily undertaken. Rather than being uniform across an occupation or even nationally consistent, competence is shaped by situational factors, emerging technologies, specific occupational requirements, and the capacities of those who enact those requirements. Competence has many elements which are acquired through different ways (p.34).

In a standards-based system the specific outcomes and the assessment criteria for competent performance are made explicit according to legislative requirements. Learnership candidates and apprentices are subjected to a competency test after completing each level, and the passing of the level test and the final trade test deems them competent to practice, giving them recognition as artisans in the relevant trade. The standards-based system of training and the CBMT modules as implemented in South Africa and elsewhere place critical emphasis on competent workplace performance and assessment thereof, however knowledge is seen as an important component in the development of skills (Gamble, 2003).

Recent studies in vocational education have shown that theory and practical integration are critical to raising competency levels (Bereiter & Scardamalia, 1993). In an attempt to explore

the learning experience of learners and the shaping of occupational competence in the workplace, the relationship between work organisation, tools and materials usage is taken into account. Competence is linked to performance while the quality of work performance lies within the skillful engagement of tools and machines.

The South African outcomes based education (OBE) system has placed a huge emphasis on specifying as clearly as possible the human capabilities required for work practices and broader occupational fields. The outcomes of teaching and learning within a vocational domain are located within observable performance, with knowledge being viewed as embedded in or supporting performance, rather than as a distinctive component of curriculum. However, this approach has been critiqued for its diminishing of the knowledge that underpins performance, resulting in a renewed commitment to foundational knowledge and the integration of theory and practice in vocational education.

3.8 A FOCUS ON THE LEARNER

According to Heitman (2005:69), one of the most important factors determining the success or failure of learning is a change in the role of the teacher or instructor, as traditional one-way communication of information from instructor to learner does not promote active and self-managed learning. While instructors still have an important role in planning and structuring the learning process around tasks, problems and questions, they have to relinquish their role as ‘organisers’ of the learning process in order to encourage the development of autonomous, self-directed learners who, to a large extent, ‘organise’ their own learning.

Key features of learner-centredness (Young, 2004 cited by Fuller & Unwin, 1998)

include the idea that learners should take responsibility for their own learning; that assessment should be available on demand; that outcomes, not learning processes should be prescribed; and that more emphasis is put on learners' access to resources (e.g. learning materials) than tutors (p.162).

This is certainly a far cry from the traditional approach which emphasised the teacher as the dominant figure in the learning process. Self-responsibility implies that learners learn to organise themselves without coercion.

There is much value in a learner-centred approach which takes into account the needs and perspectives of learners (Bolton & Unwin, 1996), and which offers a move away from the authoritarian transmission pedagogy. Fuller & Unwin (1998:158) argue that such an approach in its ideological form may not fully recognise the needs of the young people that make up the apprentice-client group. In order to fulfil this objective, it is necessary for them to become accomplished in the activities - conceptual, practical, social and the building of relationships - which constitute full participation in communities of practice. Fuller and Unwin (ibid) posit that a learner-centred approach in the early period of apprenticeship might have consequences for teaching and learning and the kind of pedagogy that might lead to expansive learning. They identify two conditions which if not met will prevent effective learning from happening:

first, emphasising the learner as an individual fails to recognise the social and collective aspects of learning and the benefits of participating with a range of others

in authentic tasks; and second, the lack of scope provided by the learner-led model for structured teaching misses the opportunity to enhance the quality of learning in the way advocated by Engestrom (ibid:163)

Activity theory as advanced by Engestrom (1987; 1994; 1995) sees a role for both enquiry (learner-centred activity) and teaching (teacher-centred activity) as interdependent aspects of an expansive learning process. Fuller & Unwin (1998) postulate that such an arrangement might “lead to quality interactions that include incidental as well as more structured, planned and goal orientated, learning experiences”. Evidence of expansive learning could be drawn from the learner’s ability to apply theory in ‘real’ situations, or, in the words of Ashworth and Saxton, (1990), ‘authentic theory’, and also in the ability to question existing practices and produce novel solutions to problems” (p.164). Key to the development of learners is the quality of interactions that are likely to include incidental as well as more structured, planned and goal orientated learning experiences.

Kong et al., (2014) argue that some of the skills needed for the 21st century are “inquiring and critical thinking skills to select and process useful and reliable information from varying sources for learning”. Other skills needed by learners according to Kong et al. (ibid) are “communication and collaboration skills to communicate and collaborate with their peers to complete tasks and share outcomes” (p.5).

3.9 SUMMARY

This chapter provided an overview of some of the central debates in scholarship on vocational training that are concerned with the type of knowledge acquired through workplace practice, the relative value of such knowledge acquisition, and the various modalities through which such learning occurs. It is clear that contestations around formal and informal learning, institutional and workplace learning, the methods of knowledge acquisition and appropriation through inter alia problem solving and in communities of practice, have not found resolution and continue to be vigorously argued. In order to move forward however, I accepted the premise of ‘authentic’ learning taking place in workplace settings as a basis from which to explore the learning of candidates in my study.

In the following chapter therefore, the lenses of Activity Theory and Situated Learning are interrogated as a conceptual framework for understanding the learning experienced in the workplace settings in this research.

CHAPTER 4: CONCEPTUAL FRAMEWORK

4.1 INTRODUCTION

The literature drawn upon in the previous chapter highlights the debates in scholarship around vocational theory and practice, the nature of workplace learning and possibilities for learning in work environments. In particular, the integration of theory and practice and the value of the workplace as a complementary site of learning in this regard were emphasised. Standpoint theories in vocational scholarship have tended to polarise disciplinary learning and practical learning within categorisations such as formal/informal learning; institutional/workplace learning and so on. For purposes of this study however, I want to support the views of theorists who argue that the workplace plays a critical role in building the competence of learners by allowing theory to be practised in authentic settings, resulting in enhanced knowledge and skills. In this regard I appropriate the lenses of Activity Theory (Vygotsky, 1978; Leont'ev, 1978; Engestrom, 1987) and Situated Learning (Lave and Wenger, 1991) to investigate how learning might happen in the workplace, and to later examine how learnership candidates have indeed experienced their learning in the workplace setting.

4.2 INDIVIDUAL AND COLLECTIVE ACTIVITY SYSTEMS

Cultural-historical activity theory initiated by Vygotsky (1978) posited the idea of mediation between the subject (the learner) and the object (his/her learning), where the focus was on the individual as a unit of analysis, also referred to by Engestrom (1987) as the 'first generation' of research into activity theory (See Figures 1 and 2 below).

4.2.1 First Generation Activity Theory

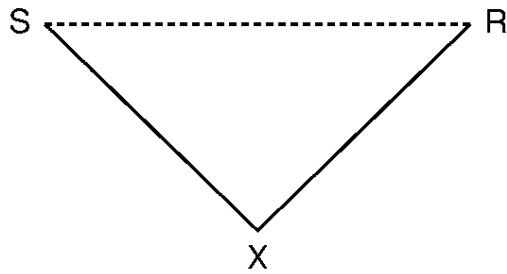


Fig 1: Behaviourist Stimuli Response Triangle

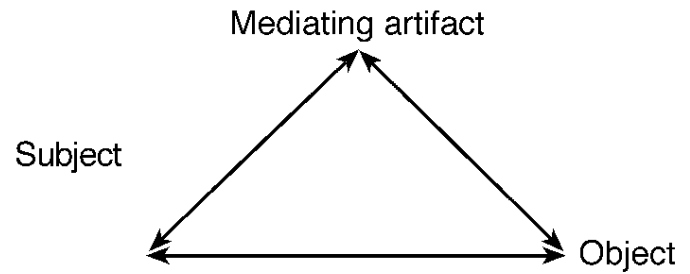
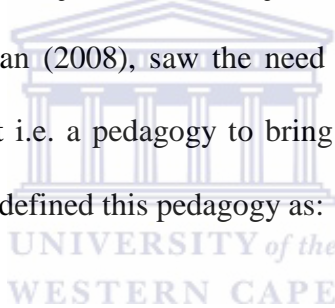


Fig 2: Vygotsky's Mediation Triangle

Figure 1 shows a direct link between stimuli (S) and response (R) whereas Figure 2 shows a mediating artifact between the subject and the object as introduced by Vygotsky (1978).

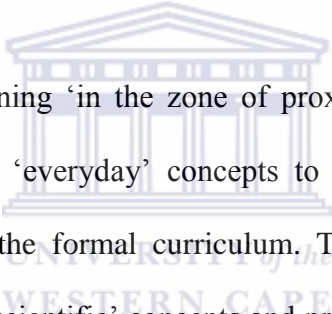
Vygotsky according to Hardman (2008), saw the need to introduce a 'device' to mediate between the subject and object i.e. a pedagogy to bring structure to the learning processes using artifacts. Hardman (ibid) defined this pedagogy as:



a structured process whereby a culturally more experienced peer or teacher uses cultural tools to mediate or guide a novice into established, relatively stable ways of knowing and being within a particular institutional context, in such a way that the knowledge and skills the novice acquires lead to relatively lasting changes in the novice behavior, that is learning (p. 66-67).

According to Vygotsky an individual can achieve more when provided guidance and assistance in obtaining the 'object' (objectives or goals). He holds that knowledge and skills acquisition occur through a dialectical process, for example via instruction, which points to the social nature of learning. Similarly, the workplace is a dynamic environment, where the

learner engages with a range of mediating artifacts such as machines, computer technology, expert others, diverse languages and cultures to name a few. Processes in the workplace communicate instructions to various role-players using artifacts, for instance charts that indicate production schedules or safety procedures specific to the workplace. Systems involve various participants, with each one making a contribution towards a specific goal, target or objective. The workplace is governed by rules and procedures to prevent confusion or to prevent accidents. It is within this environment or activity system (Engestrom, 2001) that college learners operate, where they work and learn towards achieving the objective of occupational competence.



Vygotsky's description of learning 'in the zone of proximal development' concerns itself with how learners relate their 'everyday' concepts to the 'scientific' concepts that they experience in text-books and the formal curriculum. The perceived tension between the application and integration of 'scientific' concepts and practice is emphasised by Bernstein's (1996, 1999, 2000) contentions that conceptual and practical knowledge are distinct from each other, their grammars are different, their epistemologies differ, and hence they are oppositional. However Bhyat (2011) in his research showed that the gap between vertical and horizontal discourses can indeed be bridged in situations which enable learning.

Leont'ev (1981) later introduced the notion of a collective activity system, where an activity consists of a goal-directed hierarchy of actions that are used to accomplish the object, namely *activities*, *actions*, and *operations*, and which Engestrom (1987) refers to as the 'second generation' of activity research (See Figure 3 below). Leont'ev's example of the "primeval

collective hunt” (1981, pp.210–213) clarified the distinction between individual action and collective activity and placed division of labour within this definition of activity.

In Leont'ev's activity system the activity is composed of subject, object, actions, and operations (1974), where the *subject* is the person or group engaged in an activity, and the *object* (or 'objective') is held by the subject and motivates activity, giving it a specific direction” (Nardi, 1996, p.3). Nardi (ibid) posits that “actions are goal-directed processes that must be undertaken to fulfill the object”. Activity theory thus emphasises motivation and purposefulness, and is optimistic concerning human self-determination (Engeström, 1990).

4.2.2 Second Generation Activity System

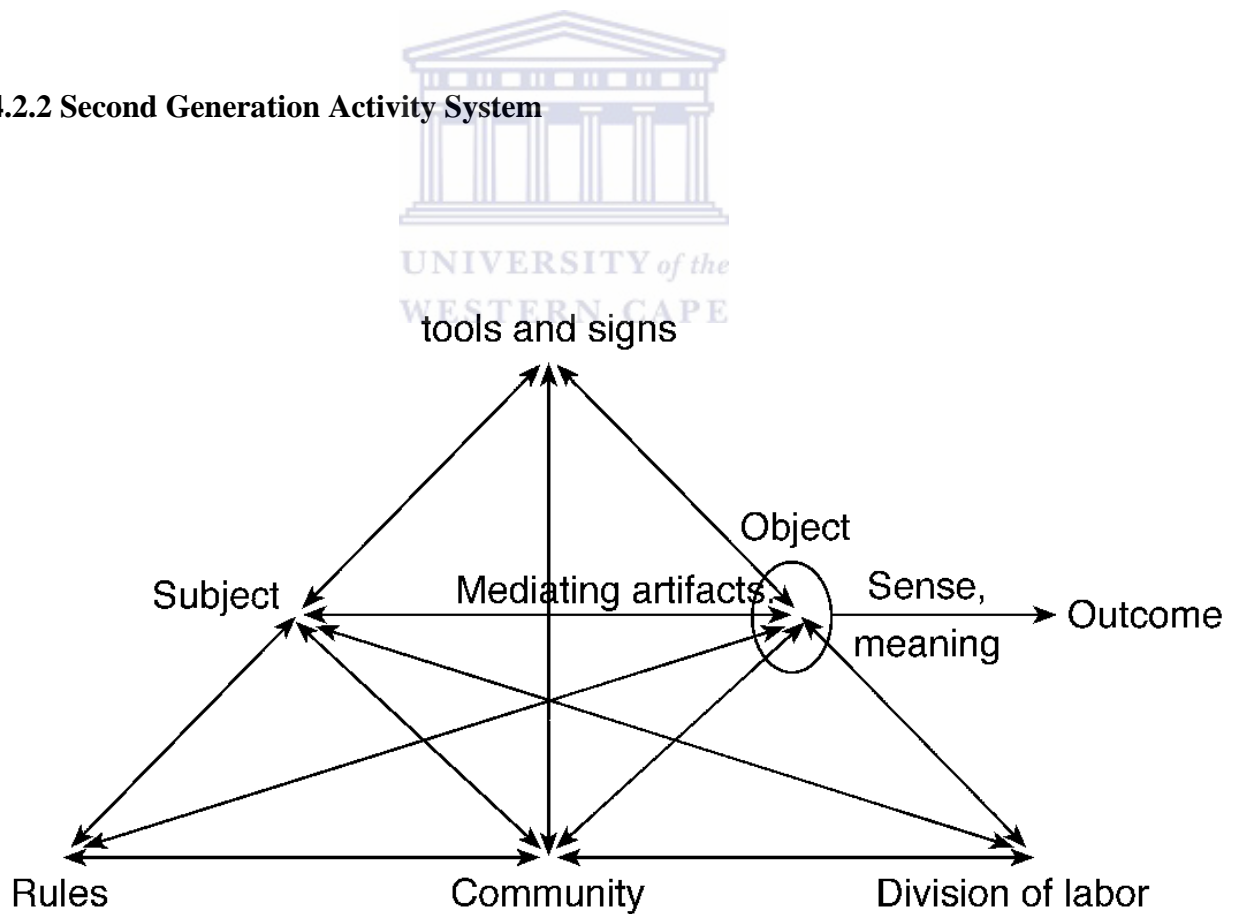
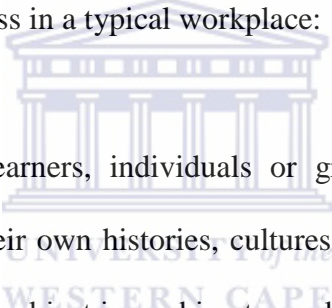


FIG.3. Engeström's Collective Activity Theory System (Engeström, 1987)

According to Engestrom (1987) and Nardi (1996), activity theory is a descriptive framework which may assist in describing elements within an activity. It takes into account an entire activity system such as the people that work for an organisation, individuals, groups and teams involved in the work organization; the environment; the culture and history of the person/s and or organization; the artifacts used or manufactured as products; as well as the dynamics within the organisation.

In Figure 3 the elements of an activity system are portrayed, showing the interconnectedness of the various elements (Engestrom 1987). A brief description of each element is given below, as well as its situated-ness in a typical workplace:



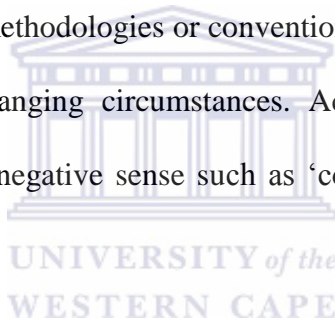
In the workplace there are learners, individuals or groups, who are engaged in work activities, all of whom have their own histories, cultures and experiences. The object is the goal of the activity, or what the subject is working towards. Engeström (1987) posits that ‘the object can provide direction as well as be partially ‘shaped’ by the mediating effects of the elements of the system as the subject works on or towards it’(p.79). Mediating artifacts are used to guide the subject towards the object, or artifacts may be used as manufactured products to acquire new knowledge and design (Mezirow, 1996). It may take the form of symbols, text and language, or as in the case of this study, machines, drawings, sketches or the curriculum in the class or workplace.

Located within the activity system is the community which comprises individuals or groups of respondents that interact with each other in goal directed activities. The community acts

on the subject in a variety of ways for the purpose of achieving the object. The division of labour allows the community to perform various functions assigned to them guided by rules and laws within the activity system.

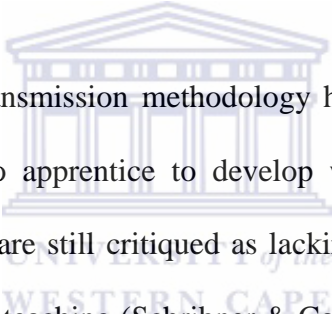
4.3 THE WORKPLACE AS A COLLECTIVE ACTIVITY SYSTEM

The workplace can be seen as a collective activity system where the subject engages in goal-directed activities mediated by artifacts. A division of labour makes provision for individuals in the community to exercise their authority depending on their rank and seniority. The participants have their own diverse histories while the workplace organisation is embedded in its artifacts, rules, norms and methodologies or conventions. Workplaces may be shaped and transformed over time by changing circumstances. According to Engestrom (ibid) this contradiction is not seen in a negative sense such as ‘conflict or trouble’ but, rather as an agent of change.



Existing approaches to learning have tended to rely on behaviourist and individualist assumptions, dependent on transmission modes where the concept of knowledge transfer is treated as a de-contextualised process (Guile & Young, 1991). Emerging socio-cultural-historical theories take issue with the abstract de-contextualisation of learning where the methods of education assume a separation between “knowing and doing, treating knowledge as an integral self-sufficient substance, theoretically independent of the situations in which it is learned and used” (Brown et.al., 1989). Traditional schooling with its de-contextualised and transmissive methodologies defeats its own goal of providing useable robust knowledge (ibid).

Socio-cultural activity theory introduces the idea of mediation using artefacts as an important aspect of the learning process (Schribner and Cole, 1971) and according to Guile and Griffiths (2001) accord more importance to the interaction between expert-others and apprentices that facilitates practical participation in, and eventual understanding or mastery of, different activities. Nardi (1996) argues that in activity theory, context is both internal to people—involving specific objects and goals—and at the same time external to them, involving artifacts, other people, and specific settings. Artifacts such as machines, technology and language can be used to bring about transformative learning (Illeris, 2004).



In craft apprenticeships the transmission methodology had been the traditional transfer of knowledge from the master to apprentice to develop work-related knowledge and skill. Contemporary apprenticeships are still critiqued as lacking an explicit theory of instruction not dependent upon any formal teaching (Schribner & Cole, 1971), where learning is seen as a natural process that occurs via observation, assimilation and emulation, without any substantial interventions from more experienced others. However, learnerships require a close link between practice and theory, between workplace knowledge and conceptual knowledge, and knowledge creation requires an interaction between both the tacit and explicit, not through one or the other in isolation (Nonaka et al., 2000).

The workplace requires a pedagogy that can successfully integrate formal and informal knowledges which result in the competence of learners. Modern artisans need 'knowledgeability' (Guile & Young, 1991), equipped with what Bhyat (2011) referred to as

‘technological literacy’, stressing the importance of the deeper conceptual and theoretical underpinnings of technology rather than only ‘technological skill’, a term associated with a narrow focus on work-based skills acquisition.

4.4 SITUATED LEARNING IN COMMUNITIES OF PRACTICE

Both activity theory and situated learning theorists view learning as a social practice and subscribe to the notion that learning is socially, historically and culturally driven (Lave, 1995, p.2). In this regard Lave argues that situated learning is embedded within activity, context and culture, and is seen as a natural process within communities of practice through what Lave and Wenger (1991) call ‘legitimate peripheral participation’. Social interaction and collaboration are thus essential components of situated learning — learners become involved in a ‘community of practice’ which embodies certain beliefs and behaviors to be acquired. As the beginner or novice moves from the periphery of a community to its center, he or she becomes more active and engaged within the culture and eventually assumes the role of an expert, undergoing an ‘enculturation’ process (Lave & Wenger, 1991). Lave explains:

Developing an identity as a member of a community and becoming knowledgeable skillful are part of the same process, the former motivating, shaping, and giving meaning to the latter which it subsumes (Lave & Wenger, 1991, p. 4).

Furthermore, “knowledgeable skill is encompassed in the process of becoming a full participant, an old-timer, of assuming an identity as a practitioner” (ibid, p.9). Participation in

communities of practice is therefore a critical aspect of developing 'knowledgeability' or working out the meaning of an idea in the context of its being used (Guile & Young, 1991). Lave and Wenger (1991) expand on Cole's (1985) argument that culture and cognition create each other within the 'zone of proximal development' (ZPD). Within the (ZPD) the subject or learner experiences the intervention of an experienced teacher or expert other via mediation, using cultural tools including language. Lave and Wenger (1991) argue similarly that learning is enhanced through the intervention of expert-others in 'communities of practice'.

The workplace as a site of dynamic interrelationships between social, cultural, technological and linguistic practices affords individuals and groups opportunities to learn over a period of time. This, Hardman (2008) avers, has pedagogical implications since learning needs to be planned and structured if meaning is to be derived from it. Learners cannot be left only to copy or imitate, enact or emulate the actions of the mentor or artisan (Engestrom, 1994) and may be in need of planned interventions by a qualified person in the form of a teacher/lecturer or a mentor.

Situated action models emphasise the emergent, contingent nature of human activity, the way activity grows directly out of the particularities of a given situation. Suchman (1987) cited in Nardi (1996) states it thus: "the organisation of situated action is an emergent property of moment-by-moment interactions between actors, and between actors and the environments of their action" (p.36). In this regard situated learning extends our understanding of activity theory.

According to Lave (1988) situated action has to occur in a relationship between the individual and the environment, but the structuring of activity can only grow out of the immediacy of the situation rather than preceding it (Suchman, 1987; Lave, 1988). In situated action, every activity is by definition uniquely constituted by the factors that come together to form one 'situation'. Situated action focuses on the way people orient to changing conditions (Nardi, 1996), and what the analyst observes is the subject's response to a stimulus (the 'situation'):

Thus we find a major difference between activity theory and situated action: in the former, the structuring of activity is determined in part, and in important ways, by human intentionality before the unfolding in a particular situation; in situated action, activity can be known only as it plays out in situ. In situated action, goals and plans cannot even be realised until after the activity has taken place, at which time they become constructed rationalisations for activity that is wholly created in the crucible of a particular situation (Nardi, 1996, p.6).

4.5 SUMMARY

Learnership and apprenticeship candidates complete a period of classroom based learning before entering the work environment in which it is assumed they will continue their learning towards occupational competence. However, in the South African context little is known about what the workplace learning situation constitutes, and what affordances enable learning to occur. Theorising practical learning through the conceptual framework of activity theory and the Vygotskian socio-culturalist paradigm enables a contribution to the existing

knowledge base on what are often taken-for-granted, un-problematized critiques of learning that takes place in the workplace.

I now turn to the research design which sets out the processes followed in exploring the workplace learning environments of learnership and apprenticeship candidates, and the methodologies by which data was collected and analysed.



CHAPTER 5: RESEARCH DESIGN

5.1 INTRODUCTION

How do college learnership/apprenticeship candidates experience learning in the workplace and what learning opportunities are afforded them to enhance their occupational competence?

The workplace is an authentic or real-life setting for learning unlike that which learners experience in the college workshop or practicum. Effective learning in workplaces, as alluded to in the literature on situated learning, comprises 'authentic' activities in the presence of experts and other individuals who are engaged in day to day operational tasks. As explained at the outset, the intention of this research was to investigate empirically the kind of learning that is occurring in workplaces, by exploring the learning experiences of college learners during their mandatory internships. This chapter thus sets out the research methodology, including the rationale for the approach employed, the selection of targeted respondents and strategies for data collection. Ethical considerations and perceived limitations of the study are also detailed herein.

5.2 RESEARCH ASSUMPTIONS

Based on my earlier experience as a vocational lecturer and qualified artisan, as well as anecdotes gathered over the years, my research question/s had some starting assumptions. These assumptions find expression in many of the policy documents concerned with skills development and vocational education more generally. A major assumption of policy is that

that although there may be imperfections, workplaces are indeed necessary sites of learning where learning opportunities are afforded in order for candidates to achieve competence. My own assumption, to a lesser extent, and based on local anecdotal evidence, was that learners' experiences of the workplace were largely negative, with not much learning actually taking place. By choosing an exploratory approach, I was compelled to be receptive to what my investigations would yield rather than adopting the mode of 'testing' my own and policy assumptions.

5.3 RESEARCH APPROACH

According to Andrade (2009:43) an interpretive approach provides a deep insight into "the complex world of lived experience from the point of view of those who live it" (Schwandt, 1994, p. 118). Andrade (ibid) argues further that interpretive research assumes that reality is socially constructed, and the researcher becomes the vehicle by which this reality is revealed (Cavana, Delahaye, & Sekaran, 2001; Walsham, 1995a, 1995b). This approach is consistent with the construction of the social world as characterised by interaction between the researcher and the participants (Mingers, 2001). From this perspective, the researcher's interpretations play a key role, bringing "subjectivity to the fore, backed with quality arguments rather than statistical exactness" (Garcia & Quek, 1997, p. 459). Researchers' basic beliefs and worldviews according to Andrade (2009:44) lie behind their theoretical perspectives.

Denzin and Lincoln (2005:3-4) define qualitative research as a "situated activity that locates the observer in the world". Qualitative researchers study occurrences in their natural settings,

attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them. Accordingly qualitative researchers deploy a wide range of interconnected interpretive practices. According to Denzin and Lincoln (ibid), qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is being studied, and the situational constraints that shape the enquiry (p.10). The qualitative research methodology allows role-players to express their lived experiences in the workplace (Rubin & Rubin, 1995).

A qualitative, interpretive paradigm accorded well with my research intentions at the outset, as I wanted to explore how learners were learning in their engagement with the workplace environment. I understood from my own experience that the workplace is constituted by expert others, mentors, communities of practice, mediating artifacts and work processes inter alia, but how these elements operated together in the presence of each other was an investigation I looked forward to undertaking.

5.4 RESEARCH DESIGN AND METHODOLOGY

5.4.1 Using a case study method

Yin (2003) defines the case study as empirical inquiry that investigates a contemporary phenomenon within its real-life context. Merriam (1998) concurs that a case study design is employed “to gain an in-depth understanding of the situation and meaning of those involved” (p.19). Furthermore, a qualitative case study makes it possible to explore how learners experience things in their ‘natural settings’ (Firestone, 1987, in Merriam, 1998; and Patton, 1987) or ‘everyday life’, from their own perspectives (Morse 1994:1; Duffy, 1987).

My quest was to understand how learning occurs in the workplace, from the perspective of the candidates. I therefore engaged with learners and *their* explanations of how and what they learned, and the circumstances under which this occurred. Adelman et al., (1980) holds that case studies generate data that is grounded in ‘reality’ - as was the case of the learners in this study who were engaged in ‘real world’ activities in their workplaces.

The issue for this exploratory case study approach was the learning experiences of learnership/apprenticeship candidates in the workplace. While the targeted sample consisted of three groupings of candidates in four trade areas, they did not constitute distinctly different cases, since their contextual realities were by and large the same, and the focus was not on comparison across cases or contexts. This research treats the three groups of candidates within the four trade areas as a single case study with embedded units, which might, in future iterations of the research, or for other purposes, be examined for differences or similarities across the units of the case (Baxter & Jack, 2008). The overarching emphasis in *this* study was how college Engineering candidates learn in the workplace, albeit in different trades, given that they were all learnership/apprenticeship candidates subject to the same programmatic requirements.

5.4.2 Targeted respondents

Three sub-fields of Engineering studies at TVET colleges, namely fitting and turning; motor and diesel repair and maintenance; and auto electrical trades were selected as focus areas. These trades were within my own area of training and experience, giving me a personal interest in the investigation. I also considered accessibility of the research sites: learnerships

and apprenticeships in the selected trades are well-established at most TVET colleges, being part of the long-standing historical college offerings. I chose to conduct my research at a large multi-campus college in the Western Cape which I as the researcher would have relatively easy access to. I nevertheless sought the requisite permission from the relevant Department of Higher Education and Training and from the college management (See Annexures hereto).

For reasons detailed earlier herein, at the time of my fieldwork there had been a declining number of apprenticeships and learnerships at public colleges, thus limiting the pool of potential respondents that could be drawn upon. Initially I had intended to conduct the research with fitting and turning learnership candidates only, but due to the low numbers of these students at the college, and since my focus was on workplace learning in Engineering programmes, I widened the pool to include the auto electrical field, which resulted in two groups of public college learners, a group of 20. In addition, a large private motor training academy offered me access to a group of auto repair and maintenance apprentices at its site, which increased the targeted group to 30 participants. This private institution in the Western Cape trains both learnerships and apprentices for the motor industry, is accredited by the relevant SETA, the MERSETA, and has trained motor apprentices for many years. The Training Academy was equipped with the necessary equipment and facilities used in computerised technology currently in motor vehicles.

I directed a letter of request to candidates asking for their participation in the research, and requesting that they sign a statement of voluntary participation (see Appendix B). Thirty

students (three groups of 10) agreed to be interviewed and to be part of the research project. Appendix G provides more detailed information on the demographics of the targeted respondents, a racially diverse group with the youngest being 21 years and the oldest being 38 years. Most had some work experience in a range of other capacities before returning to the workplace to obtain formal trade qualifications. In this regard therefore, the formal learning of the college programme was new to them, and their application of that knowledge and skills was also new.

As college learnership and apprenticeship programmes are nationally standardised, learners across the country undergo prescribed theoretical training at accredited colleges. Their experiences in the workplace potentially differ, at this time still representing a ‘black box’ about which not much is known. Hence my interest in a case study approach was to enable me to closely examine learning at the coalface with a targeted group of participants - an approach I hoped would yield findings that might impact on commonly held perceptions.

In order to understand the organisation and management of the fitting and turning, and motor learnerships, I conducted interviews with three college staff members and a senior manager at the training academy in order to obtain the background against which South African college students are placed into the workplace. The detail obtained from these respondents supplemented information from the relevant policy documents and informed Chapter 3 herein on the context of learnerships and apprenticeships in South African institutions.

5.5 RESEARCH INSTRUMENTS

Research instruments employed were semi-structured interviews (Stake, 1995, in Denzyn and Lincoln 2005) and documentary analyses. In addition, I asked students to keep a journal of ‘critical incidents’ occurring in the workplace that in their view particularly illuminated and afforded insight into their learning ‘moments’.

Interviews allowed the respondents to reflect deeply on their experiences in a safe space, and as Merriam (1998) avers, to shed light on “past events that are impossible to replicate” (p.72). The interviews probed learner perceptions of what they were learning, how they were learning, their ability to apply their college learning to the workplace, and the conditions in the workplace that facilitated or hampered learning. Interview questions were based on the sub-questions relating to the main focus of the research as stated in chapter one herein. The interview protocol is attached as Appendix E.

Regarding the journalling of critical incidents (see Appendix D), the critical incident technique was first developed by John. C. Flanagan in 1954 and was used in the United States of America Air Force (USAAF) aviation psychology programme during World War 2 to develop procedures for the selection and classification of air crews. The actions of the pilots were studied to determine the high failure rate of pilots learning to fly, and the high failure rates of bombing missions. The technique provided the basis for putting in place recommendations for the selection of, and training procedures for pilots. Billett (1994) holds that the critical incident approach allows learners to talk to the various aspects and circumstances that have an influence on their work-based learning.

Individual interviewees were asked the same questions in order to ensure consistency (Patton, 1980, cited in Cohen et.al., 2000), although the use of semi-structured interviews allowed me to “obtain multiple responses to set questions and for detailed responses” (Struwig and Stead 2001: 98), to be given.

Participants discussed their interactions at the workplace and their engagement in workplace activities. In addition, I obtained their critical incident reports and elicited data grounded in actual problem-solving incidents. Twenty learners completed the critical incident journals in which they described the learning moments they had experienced in the workplace, the difficulties they encountered, and how they had dealt with these occurrences.

As all learnership/apprenticeship candidates are required to have logbooks signed off by both the candidate and their supervisors in the workplace, the logbooks provided verification of the curricula activities that the candidate had completed, and could be probed in interviews to detail the learning that had taken place in relation thereto.

5.5.1 Data Collection

Since interviewing candidates in the workplace would have interfered with productivity, the respondents agreed to be interviewed outside of work hours, for about 90 minutes per individual interview.

A few days prior to the interviews, the college programme manager agreed to introduce me to the students and I explained to them very briefly the reasons for the interview. Individual interviews were arranged in advance and learners were informed of the day, time and place of the interviews. Interviews were scheduled over a period of time so as to cause as little disruption to the programme as possible. A venue was provided which was quiet and private. At the outset of each interview the respondent was given the consent document to read and sign. I confirmed that the interview would be strictly confidential and respondent names would not be used. I also asked their permission to audio record the interviews. Some of the questions had to be rephrased during the interview because of language challenges due to English not being the first language of many of the respondents.

5.5.1.1 Group 1: Fitting and Turning candidates

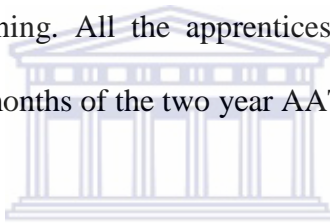
These candidates were contracted to diverse companies and government institutions in the Western Cape. The majority of learners in this group had a matric qualification save for one who had a Grade 8 and a N2 qualification. They were indentured as apprentices in various mechanical trades as follows: four mechanical fitters, a toolmaker, a turner, three printers' mechanics and one millwright. Their work experience ranged from 3 years to 24 years (though not all in the trades they were studying) and they were at various phases in their apprenticeship programme ranging across Competency Based Modular Training (CBMT) phases 1- 4. Each phase consists of a number of modules with a theoretical and practical component, after successful completion of which the institution signs it off. Five of the ten apprentices in this group were in the process of completing phase 4, two apprentices were busy with phase 2 and three apprentices were busy with phase 1 training. After completion

of each phase at the training provider, the apprentice returns to the workplace. Completed modules are signed off by the apprentice and instructor/lecturer, and after completion of phase 4 the apprentice can apply to undergo the trade test subject to certain criteria being met: time completion (4yrs) phases 1-4, full N2 minimum (preferably N3). While in training at the training provider apprentices are assigned to a college instructor/lecturer depending on the level of the training.

5.5.1.2 Group 2: Short Contract Indentured candidates

The second cohort of respondents was from the Mayor's Apprentice Project (MAP), an Accelerated Apprenticeship Training Project (AATP) hosted by the City of Cape Town to 'fast track' or accelerate skills development in the Western Cape. These respondents were indentured by the City as apprentices on a two year contractual basis with no guarantee of permanent employment after completing the apprenticeship. This is similar to the learnership programme where an agreement is signed between the apprentice, the city, and the institutional provider. The apprentice is paid a stipend each month until the end of the contractual agreement. These apprentices are stationed at various city council depots and are rotated from time to time. The depot serves as the apprentices' workplace where he/she works under supervision. The respondents from MAP served a two year accelerated apprenticeship which meant that they had to be fast learners, hence the apprenticeship had strict criteria for indentureship into the programme namely, a Grade 12 qualification which included a pass in mathematics and science. Under normal circumstances an apprenticeship could stretch over four years, but in the AATP programme students had to complete their apprenticeship within two years. Since the depots were not fully equipped to train

apprentices, a host of vendors were contracted by the city council to assist in training the apprentices in modules for which the depots were not equipped. Most depots are equipped with limited resources and are used mostly to train the apprentices how to perform basic motor/diesel vehicle services, battery testing and vehicle brake repairs. Specialist jobs like transmission and differentials are outsourced to a vendor where the apprentices are sent on a rotation basis to get exposure to specialist jobs. The MAP group interviewed comprised ten apprentices: 4 apprentice auto electricians and 6 apprentice diesel mechanics in the age group 24 years to 32 years, of both genders. All of them attended the same TVET college as the Group 1 respondents but were at different campuses for CBMT training which comprised both theory and practical training. All the apprentices at the time of the interview had completed one year and three months of the two year AATP programme.



5.5.1.3 Group 3: Private Indentured Motor Mechanic candidates

I was fortunate to being given permission to interview a group of apprentices at a private accredited training academy with computerised technology currently used in motor vehicles. All the apprentices in this group were indentured motor mechanic apprentices who were employed by motor franchises dealing with new and used vehicles of which the engine systems were highly computerised. The majority of the apprentices had a Grade 12 certificate and some had the NATED N2/3 qualification. Their ages ranged from 21 years to 28 years, and they were all males. Four of the apprentices in this group were doing CBMT L4, two were learnership candidates doing NQF L3 and NQF L4 respectively, two apprentices were doing CBMT L2 and two had just started with CBMT L1. The CBMT training programme was an industry accredited qualification which included training of a practical and theoretical

nature. Each phase consists of a number of modules with a theoretical and practical component after completion of which the apprentice returns to the workplace to reinforce the formal institutional training. The duration of training at the academy is one week per month. A reason cited for this was to shorten the turn-around time for skills training and give learners the opportunity to bring their recent workplace learning encounters and challenges to the attention of the lecturers at the academy, for discussion and evaluation, which might lead to a planned learning intervention.

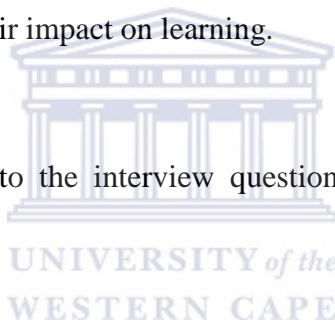
5.5.2 Data Coding and Analysis

An important aspect of data analysis in qualitative case study is the search for meaning through direct interpretation of what is observed as well as what is experienced and reported by the subjects. Bogdan and Biklen (2003) define qualitative data analysis as “working with the data, organising them, breaking them into manageable units, coding them, synthesizing them, and searching for patterns”. The aim of analysis of qualitative data is to discover patterns, concepts, themes and meanings.

Yin (2003) discusses the need for searching the data for “patterns” which may explain or identify causal links in the database. A process sometimes referred to as “open coding” (Strauss and Corbin, 1990) is commonly employed whereby the researcher identifies and tentatively names the conceptual categories into which the phenomena observed can be grouped. The goal is to create descriptive, multi-dimensional categories that provide a preliminary framework for analysis.

The data I gathered was captured on audiotape, and then transcribed. Using electronic software (Atlas Ti) and with assistance from a technical expert, the data was coded and themes identified using colour coding for easy identification. Using the colour coded categories, key research themes were generated from the research data, which were subjected to a second round of analysis. Core or central themes identified were: learning methodologies used in the workplace; the influence of the workplace environment in the learning process; the influence of mentors and expert-others in the workplace learning process; perceptions of how best to learn in the workplace; integration of theory and practice in the workplace; coaching and assessment in the workplace; opportunities to practice in the workplace; and workplace expectations and their impact on learning.

These central themes related to the interview questions that had been derived from the research sub-questions.



5.6 ISSUES OF VALIDITY AND RELIABILITY

Merriam (1998) cautions that traditionally the constructs of reliability and validity are quantitative and positivist, and not necessarily applicable to qualitative research (p. 199). Assessing the accuracy of qualitative findings however is complex. Lincoln and Guba (1985) consider member checking into the findings as “the most critical technique for establishing credibility” (p. 314). Seale (1999) advocates that transferability is achieved by providing a detailed, rich description of the settings studied to provide the reader with sufficient information to be able to judge the applicability of the findings to other settings that they know (p. 45).

5.6.1 Reliability

Reliability in qualitative research terms means “producing results that can be trusted and establishing findings that are meaningful and interesting to the reader” (Trauth, 1997, p. 242) rather than showing consistent results by repeated analyses. Andrade (2009) argues that no certainty might exist for a second researcher to come to the same conclusion as the first researcher, since “the second researcher can use the same data and give a different interpretation based on her/his own beliefs and abilities to grasp the essence of the emotional context” (p.50). Andrade (ibid) postulates that “presenting the chain of evidence contributes to the trustworthiness of the analysis” (p.50), which ties in with what is also referred to as “theoretical sufficiency” (Dey, 1999, p. 117).

According to Merriam (1998), dependability refers to the extent to which research findings can be replicated (p. 205), but suggests that reliability in this type of research should be determined by whether the results are consistent with the data collected.

5.6.2 Validity

Validity refers to whether the researcher has actually measured what he/she set out to measure (Bell, 1993: 65). As this study was an exploratory one, I remained open at all times to the findings and what could reasonably be inferred from my data. This study used an interview process to gather data that was guided by the research question and sub-questions. However, an interview process can be fraught with all kinds of problems and any potential bias must be minimised (Cohen et al, 2000: 121). Sources of bias could include: attitudes, opinions and expectations of the interviewer, a tendency for the interviewer to see the respondent in his/her own image, and a tendency for the interviewer to seek answers that

support his/her preconceived notions. Other sources of bias could also include misperceptions on the part of the interviewer of what the respondent is saying, or misunderstandings on the part of the respondent of what is being asked (Cohen et al, 2000: 121). In an attempt to minimise bias in this study, the same questions were asked of all the respondents, however, the semi-structured interview allowed for questions to be expanded upon using words that might be easier for the respondent to understand.

5.7 ETHICAL CONSIDERATIONS

In a qualitative study the researcher is afforded the opportunity to socially interact with the participants and therefore enters their personal and private space (Silverman, 2000, p. 201). Miles and Huberman (1994), and Seale (2004) list a number of ethical issues to be considered, inter alia: do participants have full knowledge of what is involved; can the study hurt participants; is the researcher truthful in presenting data?

In this research process risk to the respondents was minimised in that they were all over 18 years of age; confidentiality was rigorously observed by not using names of respondents or their employers; and respondents were not asked to reveal confidential information about any other persons in the institution. Furthermore, the consent of all stakeholders was sought via a covering letter requesting their participation in the research. A letter to the relevant authorities requesting permission to conduct the research was submitted and permission was duly granted. None of the institutions were named so as to avoid any potential prejudice.

5.8 LIMITATIONS OF THIS RESEARCH

While the fact that this research was limited to two training providers and a few employers could be seen as a limitation to generalisability (even though representativity is not the goal in such a case study approach), the training circumstances and curricula are representative of the population of learnership candidates. The number of apprenticeship and learnership candidates across public and private training providers is not extensive for reasons sketched elsewhere herein but notwithstanding, the intention in this research was to achieve depth rather than breadth. Assumptions about the learning received by candidates in the workplace are widespread, and little empirical work exists that support or refute these assumptions. Moreover, the candidates were employed in a wide range of workplaces, which increased the range of learning experiences that they could potentially be subjected to.

Within the limitations of qualitative, interview based research therefore, I am confident that this case study affords a credible window into workplace learning experiences of learnership/apprenticeship candidates in the South African context.

5.9 SIGNIFICANCE OF THIS STUDY

Workplace learning has been a key focus of researchers around the world. In South Africa reports have been published and commissions appointed by the government to look at improving vocational education and in particular apprenticeship training, its shortcomings and how to improve the quality of training. This study adds depth to the current body of knowledge by theorising which is informed by empirical evidence rather than assumptions. By engaging with students currently in the workplace and drawing on their experiences, their

perceptions and their practices, this study draws conclusions that are grounded in reality and can point to strengths and weaknesses of the current training environment.

In the chapter which follows, the findings generated in terms of the research design and in view of the considerations applicable to case study research, are comprehensively set out.

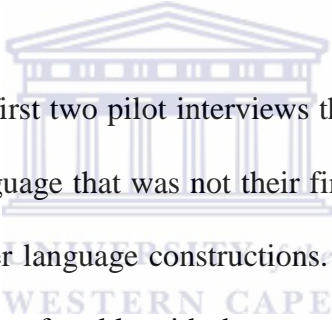
5.10 SUMMARY

This chapter set forth the research methodology, including the rationale for the approach employed, the selection of targeted respondents and strategies for data collection. Ethical considerations and perceived limitations of the study were also detailed herein including the potential significance of the study. The following chapter deals with the findings of the data gathered in interviews conducted with the respondents that span the three sub-questions of the research. What follows are detailed perceptions of the candidates' workplace learning experiences and their articulated views on how they experienced the 'real' world of work.

CHAPTER 6: FINDINGS FROM THE DATA

6.1 INTRODUCTION

As indicated earlier in Chapter Five, interview questions were semi-structured, and were pertinent to the sub-questions disaggregated from the main research question. To reiterate, the sub-questions within which the data has been organized below are: ‘How are college candidates learning in the workplace?’; ‘How do they apply their institutional learning in the workplace? and, ‘What learning opportunities are afforded them towards building their occupational competence?’



It became apparent during the first two pilot interviews that some respondents had difficulty expressing themselves in a language that was not their first language, and I had to re-phrase questions at times using simpler language constructions. This was done to put them at ease and they appeared to be more comfortable with the approach. As questions probed a number of similar issues, respondents at times went beyond the question and gave details which were covered in other questions, hence considerable sifting of the data took place subsequently in order to separate emergent themes. I made use of Atlas ti to code the data and applied several iterations, both electronically and manually, to accumulate ‘thick’ evidence for the themes that emerged.

In the sections which follow, themes are arranged within each of the large sub-questions in order to comprehensively set out the relevant data that each sub-question elicited.

6.2 'EVERYDAY' LEARNING IN THE WORKPLACE

This sub-question covered the various modes of learning that candidates experienced during their internship. The table below illustrates the various learning methods reported as candidates' exposure to learning. Aggregation of the responses was done by the Atlas Ti software according to the responses of the 30 participants.

6.2.1. Learning methods experienced

Table 6.1 Method of learning N=30

Method of learning	Frequency	Frequency %
Observation	27	90%
Listening	8	27%
Questioning/Talk	20	67%
Doing	22	73%
Demonstration	2	7%

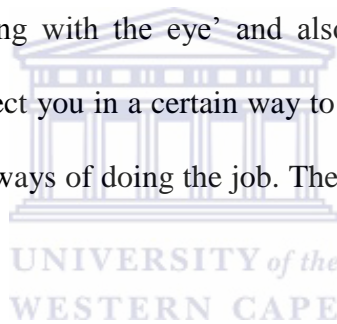
Most respondents (90%) agreed that they were exposed to observation predominantly whereas (73%) indicated that they had learned by doing the activities themselves. More than half of the group also reported that they could question others in the workplace (67%). Some respondents (27%) learned by listening and a few others by demonstration (7%).

The table suggests that respondents were exposed to a range of learning methodologies that were at times incorporated into one activity, or utilised at different points in their workplace training. The following extracts illustrate this as follows:

I ask questions like; what are you doing, why are you doing it, how do you do it and then I want to do it by myself.....give me the spanner I want to do it myself....(R3a).

I learn by observing to try and understand what they are doing, and why they are doing it. If there is a similar job next time then I can try it out. I would do the job and, if I get stuck then I would ask them for assistance. I would analyse why they do....(R4a)

I would say by 'stealing with the eye' and also asking questions on the job, for instance if they can direct you in a certain way to do the job because they always tell you there are different ways of doing the job. They show me all the different ways of doing.....(R3)



During planned maintenance then I am able to observe them, listen to them and I engage in the activities myself. So I learn....(R5)

You observe how they do the job, how they diagnose the problems, you always look-up to the person that is more experienced by observing them, listening to them and asking questions...(R1b)

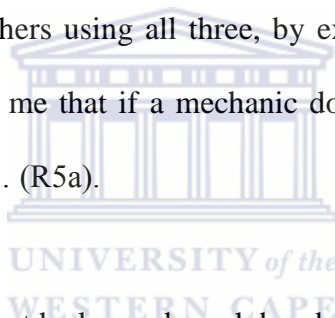
I learn basically by doing the work myself, I ask the foreman and he always explains to me where to start and where to end. If I am not sure then they demonstrate to me,

then they show and explain to you....so you learn from experience...they would let you try... (R7b)

I observe how they assemble or strip the engines. I ask questions and I do the work myself...(R8b).

Thus observation, doing and questioning were commonly reported as a means of learning in the workplace, usually in combination as according to this respondent:

I think I learn from others using all three, by explaining, by observation - another mechanic at work told me that if a mechanic does not want to teach you then you stand there and watch... (R5a).



Another respondent indicated that he learned much by observation however, he lamented that mentors are busy with their own production work:

I learn by looking at what they do first, the way they approach their job, the way they do their job. The mentor said: 'I am not here to teach you, I am here to work, you are here to learn, so you have to do the job of learning (R10).

While most of the respondents indicated that they observed and asked questions, the busy schedule of mentors was perceived as a limitation:

If you have a good relationship with the experts then they are willing to help you. He won't be irritated when you ask him to explain. The expert will be eager to assist and explain. For these experts who have a lot of experience tend to at times find it difficult to explain to someone who does not understand.....you must watch him closely, they know the shortcuts and the tricks to save time. (R1)

Some respondents felt that they were just following the flow of things in 'going with the artisan'.

You can say we talk, we observe and do activities...we learn at random...You just learn by going with the artisan (R1a).

A dominant theme was 'observation' of the expert, a methodology that will be elaborated on in the following chapter. Given the learning methods they were exposed to in the workplace, respondents were asked what, in their opinion, were the best ways to learn in the work situation, and responses were as indicated in the table below.

6.2.2 Candidates' views on how they learn best

Table 6.2 Opinions on the 'best' way to learn in workplace N=30

METHODS	FREQUENCY	PERCENTAGE
OBSERVING	10	33%
Asking questions	9	30%
By doing	25	83%
Demonstrations	9	30%
Guidance	10	33%
Texts, drawings, manuals, videos, computers ('artifacts')	6	20%

In spite of reporting that they mostly learned by observation in the workplace, the table shows a majority of responses by learners who thought they would learn best 'by doing' (83%) - double the number of those who also thought observation was important for learning. Candidates also mentioned a number of artifacts that they were exposed to in the workplace. However, responses are still clustered around learning by observation, demonstration, asking questions, guidance and artefacts, which extracts from the data illustrate below.

I think the best way for me... by doing the work physically, practically, it gives me understanding, by asking questions, by watching them. Somebody can tell me over and over how to do something, but I might not be able to apply it with my hands, once I get used to doing it myself then I will be able to understand why it is they are

telling me that I must do it in that way....I would also like to do something under guidance in case I make a mistake (R4a).

You must have the right attitude, you must ask questions, write them down, books also help like manuals, the internet....if you need information and, also by doing things yourself. I need to be active on repetitive work every day to learn....I need exposure (R8a).

By observation, asking questions, demonstrations, consulting manuals...not actually reading, I do not like reading... by trying out things by myself, to solve the problem otherwise I rather first make sure by asking if I am on the right track (R1).

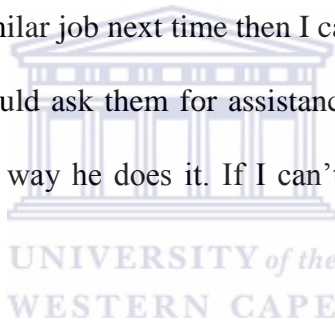
The best way for me to learn is hands-on, if you get stuck you ask...they must show me and explain to me (R8b).

A candidate said that no matter how often something is explained to one, the best way to learn is to try it out for oneself, albeit under guidance or with a prior explanation. Respondents acknowledged the value of seeing the mentor demonstrating a particular activity, observing the actions closely and then following up with questions. A few respondents in addition mentioned the value of structured learning that could take place in the workplace, as it does in a traditional classroom environment.

The pressures of time in the workplace were frequently mentioned, hence the need for candidates to use artifacts such as manuals, books or videos for additional illustration. Candidates were keenly aware of the delivery schedules that their mentors or qualified artisans were under, which meant limited time for ‘teaching’ in the workplace.

The following extract illustrates the strong emphasis on observation and questioning as modes of learning in the workplace:

I learn by observing, to try and understand what they are doing and why they are doing it. If there is a similar job next time then I can try it out. I would do the job and, if I get stuck then I would ask them for assistance. I would analyse why the artisan would do the thing the way he does it. If I can’t come to a satisfactory conclusion then I would ask (R4a).

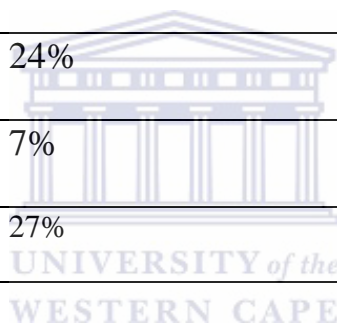


Findings here indicate a hybrid of informal and formal learning methodologies taking place, such as doing/practice, observation and demonstrations as well as consulting texts, manuals, drawings, videos and computers. Affordances which were reported as assisting in candidates’ learning are shown in the following table.

6.2.3 Other learning affordances candidates experienced in the workplace

Table 6.3 What other affordances helped candidates to learn?

Helped understanding	Percentage
Manuals	57%
Interactive Materials (computers)	40%
Drawings	77%
Duplicate parts	21%
Donor vehicle	24%
Machines	7%
College learning	27%

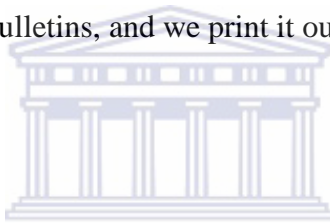


A high percentage of candidates (77%) were exposed to drawings as learning affordances in the workplace. Fifty seven percent (57%) of the respondents indicated they used manuals and texts and a further forty percent (40%) confirmed the use of computer systems connected to the internet which gave them access to data relating to their jobs. Respondents in the motor and diesel trades were more exposed to artifacts such as manuals and computers for vehicle specifications. Furthermore, computerised machines enabled fault procedures to be followed when attempting to solve problems as the candidates below confirmed.

We have a computer system that we can log intoyou type in the make and model of the vehicle and the computer gives you the specs and there are information on display boards...(R4b)

We have shop manuals...computer system like GDS, our diagnostic tool for the vehicles....you plug it into the vehicle, type in the fault codes.....if we can't find the faults then the foreman can put us onto the hotline.....we connect to Jo'burg ... (7b).

We have computers called General Diagnostic Systems (GDS)...the company uses the system to send out bulletins, and we print it out to understand what we are doing (R8b).



We have the GDS, the G10, manuals and books....for instance now recently a customer complained about a brake shudder then I looked at the service specifications in the books... (R9b).

It was evident that the motor trade routinely used manuals and videos since these were 'tools of the trade' for trouble-shooting motor problems.

A large percentage of respondents (77%) experienced drawings as a teaching and learning method as in the extracts below.

We did not know how to connect a relay switch and how to use wiring diagrams because we did not do that at the college, so he showed me how to connect a relay based on a drawing, how does the starter system work, how are the lights working (R3a).

He showed us wiring diagrams that indicated how the circuits work. He used drawings a lot to explain...(R4a).

Some of the artisans used drawings to make me understand... he used a drawing to show a gear system calculation (R5a).

My artisan always used drawings to show how the clutch works. So he showed me a diagram to show the flow of the brake fluid from the master to the slave cylinder. On another occasion he explained the turbo charger using a drawing.... (R8a).

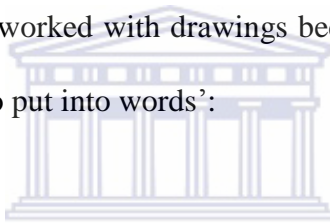
The mentor often used drawings, which is the simple way of explaining things to you- to make you understand. He also demonstrated things to me, for example when railings have to be welded, then he would weld first, however he first explains the current settings (R1).

We use drawings which we get from the computers. My mentor used drawings to communicate certain concepts and procedures because for a time I could not fathom

the whole concept of board-making, how it develops from the start to finish... from 'paper' to 'box'(R7).

He did, on occasion make a sketch on the direction of the belt drive when setting the timing...(R10b).

These respondents explained that drawings provided a visualisation of what was required and unlike words and sentences, the drawing provided a graphic description of what might have been difficult to articulate. This was reiterated by learners in the fitting and turning trade, who reported that they mostly worked with drawings because drawings provided the means to explain 'what was difficult to put into words':



In order to explain certain things to me the artisan would transfer it onto a drawing for me to understand. In that way it is easier and an accurate way to interpret what is meant. Sometimes the boss assigns a job to me but before I start I look at the drawing (R3).

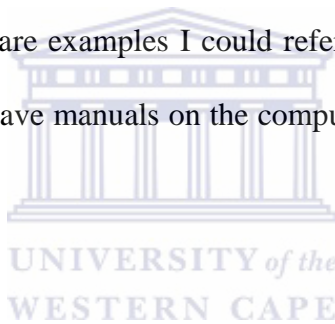
Many times....I once asked a mechanic how they determined the degrees on the cam shaft and he made a sketch.....to show how and where you measure....its many times easier than to explain....interpretation of words can be misleading...(R1b).

....also when we have to torque the engine he also use the drawings to explain (R10a).

Candidates in the workplace indicated that they found drawings provided clarity and assisted understanding, avoiding ambiguity or misinterpretation of a communication. Graphics were used frequently as a visual aid.

The data showed that learners placed much value on formal learning materials like drawings, charts and manuals (31%) followed by other artifacts such as donor vehicles (24%), duplicate parts and computers. The following extracts illustrate the affordances in the workplace environment that contributed to learning:

In the workplace there are examples I could reference that helped me to understand what I was doing. We have manuals on the computer of each machine part and also a library to access (R6).



There are different models of vehicles that we can use as examples...I was busy with a faulty cigarette lighter in the vehicle. I was not sure if the socket in the lighter was faulty or the lighter was faulty....I went to a similar model, took that cigarette lighter and tested it on the original vehicle and it worked (R1b).

Yes! Like I say there is a (computer) Whiz program...If you don't understand something then you go to the program and it assists you.....it gives you procedures....(R5b).

All the cars they put on computer then it gives you a fault. So when you double-click then it gives you a list of all the possible things that can go wrong and from there you go to the other computer that shows you what to do and how to do it (R6b).

Sometimes I might struggle with an electrical fault then I ask the guys with the electrical background.....I can't read diagrams yet.....electrical diagrams do help....the GDS also helps a lot. We sometimes use a 'donor'..... a vehicle that is donated, to work on (R9b).

6.3 INTERACTIONS IN THE WORKPLACE

All the respondents mentioned their observation of others, their asking questions, and the demonstrations that they were given. I therefore asked for details of their interactions in this regard, with whom they had interacted, and for what purpose.

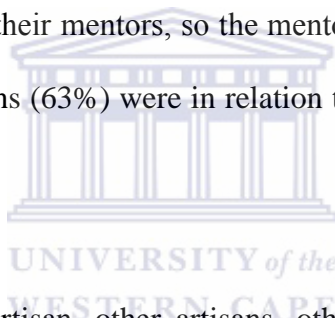
Table 6.4 Interactions with others in the Workplace N=30

Interactions with	FREQUENCY	PERCENTAGE
Mentor	16	53%
Other experts	27	90%
Other apprentices	7	23%

Table 6.5 Purpose of interactions N=30

Purpose of interactions	FREQUENCY	PERCENTAGE
Obtaining guidance	19	63%
General communication	2	7%
Sharing information	4	13%
Problem –solving	2	7%

Candidates interacted with their own mentors (57%), but had also had extensive interactions with other experts (90%). Upon reflection, I believe that candidates might have interpreted ‘other experts’ to also include their mentors, so the mentor and expert interactions should be taken together. Most interactions (63%) were in relation to obtaining guidance on the job, as extracts from the data indicate:



I interacted with my artisan, other artisans, other mechanics and apprentices and welders....they shared a lot of information with me about how are things done... he would explain and demonstrate things to me...(R3a).

I interacted mostly with my artisan because I wanted to understand my trade, so I asked a lot of questions, but I also interacted with the superintendent and other artisans like motor mechanics and other apprentices...(R4a).

When there are problems then we interact with each other, we brainstorm the problematic areas. So if there is a problem you put it on a board then they write what the problem is, why it happens, how to repair it, what they must do so that it does not

occur again So we solve problems in a group, everyone gives an input..... (R7).

I interacted with the artisan's assistant (labourer), the artisan, and the line manager, everybody that is part of that workplace. You get a lot of experience like that listening to them. I listened to the labourer because he has more experience than me (R7a).

I interacted with artisans and general workers in the workshop and at the vendors I interacted with engineers and artisans. I interacted with them to get more knowledge; I would go to the guys and ask them what they are doing, what is wrong (R9a).

It was important that we interacted with others so that we know exactly what goes for what... communication is important...everybody needs to be informed because it could create problems for production and safety... accidents could happen (R4).

Everyone gives an input...in the group there is also the manager, when there are problems then we interact with each other, we brainstorm the problem...you do it in every department(R7).

The majority of candidates responded that interactions at work had been positive, and said they felt the interactions with experts were an opportunity to obtain knowledge and skills to complete the various tasks and activities assigned to them in the workplace.

6.4 APPLYING INSTITUTIONAL LEARNING IN THE WORKPLACE

Having made the transition from the college to the workplace, learners were asked whether what they had learned in the workplace was new to them, and the table below shows their responses in this regard.

Table 6.6 Students' perception of learning in the workplace as 'new'. N=30

Learning new things in workplace	FREQUENCY	PERCENTAGE
Everything	11	36%
Most	2	6%
Some	17	57%

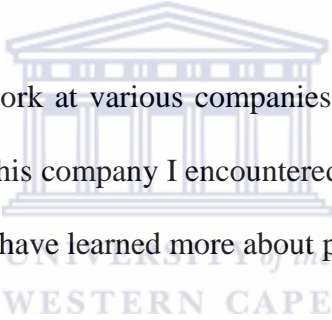
Fifty seven percent (57%) of the respondents reported that 'some' of what they learned in the workplace was being done differently, and they therefore regarded this as new to them, while thirty six percent (36%) indicated that 'everything' they learned in the workplace was so different that it was virtually new to them.

Some respondents were able to explain their experience of this 'new' knowledge as follows:

We did wiring at the college, but wiring in the workplace it is totally different to that of the college. They give you a board at the college and you sort of wire-up the lights of a vehicle but at the work you get a truck whose wires are burnt out completely....(R1a).

Everything was new because I thought that I knew vehicles. At the college it was a more controlled environment where the engine that you worked on was never going to be started, the gearbox that you worked on was never going to be put into a vehicle... (R7a).

I have learned about pumps, which I did not learn at college, how to dismantle the pump, the electrical system of the pump to test if the pump rotates in the right direction, if you wire up the pump incorrectly, then the pump rotates the wrong way (R1).



I had seven years of work at various companies. I have worked with machinery at other companies but at this company I encountered machinery that was very high tech which was new to me. I have learned more about pneumatics, and in more detail (R7).

Respondents distinguished between the simulated environment of learning at the college, to experiencing the ‘real thing’ in the workplace where the engines and gearboxes were mounted in vehicles belonging to customers. For others the nature of the activities presented new challenges, for instance the new products that were introduced to the market annually.

6.5 ASSISTANCE IN LEARNING NEW SKILLS IN THE WORKPLACE

This question was intended to cut across the range of methods and affordances for learning, to ascertain what candidates thought had most aided their learning in the workplace, especially in the learning of new skills.

Table 6.7 What helped candidates' learning of 'new' skills in the workplace? N=30

What helped?	Frequency	Percentage
College theory/training	7	27%
Artifacts	6	20%
Mentor/expert/guidance	14	67%
Doing/practice	9	40%
Observation	2	7%

The table above indicates the value learners placed on the guidance from mentors and experts in learning skills that were new to them in the workplace, followed by the opportunity to practice doing the activities themselves, their college theoretical preparation, and artifacts. Observation proved not to be of much use in the learning of a new skill, as only 2 responses indicated that as a means of learning in this instance.

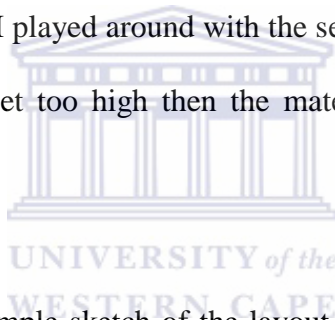
The following extracts are revealing about the role played by the expert however.

The mechanic helped me to understand by, explaining the operation of hydraulic brakes, he showed me how to strip and get the faults on the brakes. He let the general worker do it and I watch, then he explains to me (R9a).

To help me understand heat treatment they directed me to think about the job as something you do in your everyday life: like what expands and what shrinks: he would use concepts that make me understand better. He uses an elastic band to

explain the concept of expansion. He explained that there are times, when wanting to remove a bush made of hardened steel from a shaft, that water and heat are used for shrinking and expansion. In that way the hardened bush is heated...to expand, the shaft is kept cool, so in that way the bush can be removed. With brass you have to machine it off. He used examples and demonstrations (R3).

To get used to it I was given a lot of opportunities to practice - freedom to play around with the machine. He showed me how to weld but also said that I must develop my own 'feel' for welding by practising, to learn by myself with guidance and without guidance. I played around with the settings and saw the results, I noticed that if the current is set too high then the material burns. I had to find the right balance (R6).



The toolmaker made simple sketch of the layout of the channel. He made it easy to understand by making a sketch. He cut the old one through in sections so that I could have a sectional view (R10).

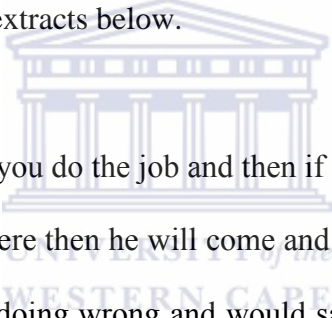
A very high proportion of candidates, ninety seven percent (97%) explained that they were able to ask other experts for guidance and assistance, as in the extract below.

I could ask my journeyman, foreman...we share information and so I learn. I was guided from my first year, now I am able to work on my own. The artisan took a step back. I started with simple work (R1b).

6.6 EXPERT GUIDANCE

Learners were asked what type of guidance they had received from their mentor or supervisor or anyone else at work.

Eighty three percent (83%) of respondents said that they had received verbal guidance from their mentor/expert whereas sixty percent (60%) said that the expert also used demonstrations. Most respondents acknowledged that their mentors gave them the scope to do the work on their own but kept a watchful eye to ensure that mistakes were kept to a minimum, as illustrated by the extracts below.



They watch you and let you do the job and then if they see ... wait you're getting mixed-up somewhere there then he will come and say, ... not like that, like this...and they explain what you doing wrong and would say ... this is the way you do it. For instance I had to replace bearings on an alternator and I put it in a little bit skew but he could see it from a distance and in my eyes it seemed ok but he came running to me to say it is going in skew, so before I damaged the bearing he helped me and showed me how to do it properly. It helped me and I did not make that mistake again (R1a).

Sometimes the artisan would say, no, you can't work like this, you must work like that, or, the easy way to do it is like this. He showed me and then he made me do the

job. Most of the time he demonstrated how to do things ... he explains and demonstrates (R3a).

I had to put on cables on a truck- one for the clutch and the other for the gear. I was struggling and I wanted to fix it myself. The artisan asked me, 'are you done, are you struggling?' Then he indicated and guided me by explaining. He does a demonstration then he lets you do it. He will look at the job and give me feedback (R5a).

After you have done the job and you explain how you have done yours, he explains how he has done his, then he will explain the easy way of doing it. He first wants to see if you are open to a job when the job comes to you (R3).

They explain to you what to do and how to do it. He shares with me his experience on cars....he guides you orally as to how and why you do certain things the way you do.....like this is the procedure to follow....be careful of this or that... (R1b).

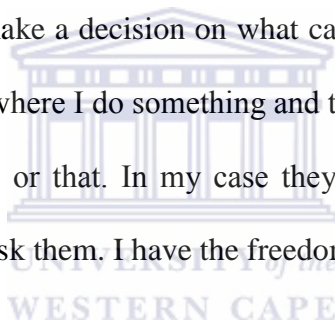
He just gives me the work then he guides me from a distance...he demonstrates and explains verbally (R4b).

They basically watch me while I do the work and whenever I go wrong the mentor/foreman would say, 'don't do it like that'. They explain the theory sometimes and demonstrate it (R6b).

A number of respondents noted that their mentors had made use of drawings to explain certain actions, as in the examples below.

They talk to me about something that I am not supposed to do, or there is something that I was supposed to do that I am not doing.....then they talk to me, sometimes they show me, demonstrate to me, it is easier than explaining (R 6a).

The mentor or supervisor does not overcrowd a person. He would provide a drawing of what needs to be done. If I find this or that needs to be right then I will consult with him and jointly make a decision on what can be done to correct the situation. I don't want a situation where I do something and then he would come and tell me: but why don't you do this or that. In my case they don't watch me, because I would rather go to them and ask them. I have the freedom to use my own initiative (R4).



6.7 APPLYING INSTITUTIONAL LEARNING IN THE WORKPLACE

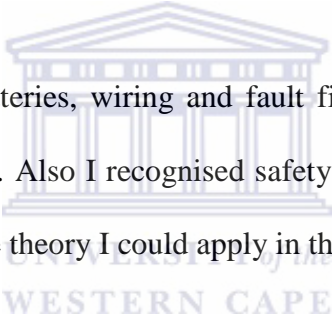
In attempting to determine whether the theory learned at the college could be applied in candidates' workplace experience, I organised responses under the major theory topics studied in the four trade areas in which candidates were working and asked which theory areas/topics they had 'recognised' in the workplace and believed they could apply in their practice. The following sections report on the findings in this regard.

6.7.1 Auto Electrical trade

Auto electrical candidates reported that they recognized the major theory sections that they

had covered at the college, and could identify this in their workplace activities. They mentioned topics which they had dealt with in theory such as starters, wiring, faultfinding, hand tools, welding, measuring, alternators, batteries, safety, power tools, bearings and seals.

Respondents in the auto-electrical trade were able to connect the theory they had learned at college to a number of activities in the workplace. Candidates in this trade were able to show that there was alignment between what was learned at the college and the work done in the workplace, albeit that some theoretical topics were less applied or practised due to the nature of the work being done at a particular time, as indicated below.



Starters, alternators, batteries, wiring and fault finding - I could apply most of the theory in the workplace. Also I recognised safety procedures which we had to apply in the workplace and the theory I could apply in the workshop (R1a).

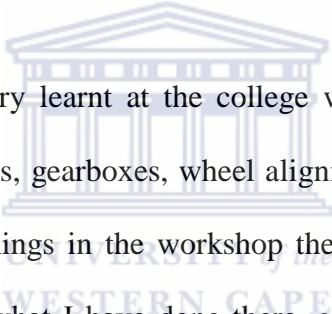
There was a fair amount of theory from the college that applied to the workshop like safety, power tools, hand tools, lifting equipment, bushes, bearings, seals, gaskets, circuitry, starters, alternators, welding (R2a).

Yes! Battery testing, alternators and starters, testing of the units, safety, the stripping, the checks that we do, visual inspection...everything I could relate the practical to the theory (R4a).

6.7.2 Diesel Mechanic trade

Similarly, in the diesel mechanic trade candidates were cognizant of the theory that applied to their trade and that they recognized as being embedded in their work activities. Topics mentioned were brakes, clutches, fuel pumps, wheel alignment, gearbox, steering box, wheel balance, shocks, differentials, overheating, measuring and ignition.

Respondents in the diesel trade could relate the theory they had covered in college to their practice in the workplace, mostly with regard to brakes, clutches and gearboxes, and other topics to a lesser extent, as illustrated below.



I did come across theory learnt at the college when I was in the workplace, like clutches and differentials, gearboxes, wheel alignment, wheel balancing and steering boxes. When you do things in the workshop then you always reflect on what was done at the college.....what I have done there, and then apply it in the workplace (R6a).

I recognized the theory on the gearbox, clutches.....its operation. When the lecturer explained the theory in the workshop I was a bit blank but when he stripped the gearbox and took off the clutch then I recognized the theory while he was talking. I could not understand the theory alone!!! He explained the clutch from the point when you apply the clutch pedal....to the cable...he used the practical to explain the theory. I also recognized injector and gearbox theory, I could see how it was applied in the workplace (R9a).

The respondents in the diesel trade confirmed that whilst engaged in activities in the workplace they could see the link between what they had learned at the college with what they were doing in the workplace.

6.7.3 Fitting and Turning trade

In the fitting and turning trade, topics mentioned were bearings, pumps, hand tools, lathes, mechanical drives and measuring.

Respondents in the fitting and turning trade identified relatively fewer of the college theory sections within their practice in the workplace. While there was some alignment between what was learned at the college and the work done in the workplace, there were mixed responses to the amount of theory that could be applied in the workplace, as this was reportedly dependent on what jobs were likely to be performed at a particular moment in time, as some candidates reported.

There was very little theory that I have learned at the college that I could apply at work. I might learn to operate the lathe at the college but do not use it in the workplace (R4).

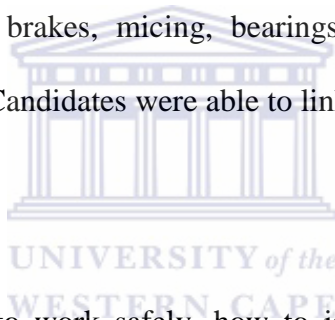
Yes! I recognized some of the theory because when I left the college, I knew how the lathe worked, I knew the parts and the functions, but I never worked with the lathe. When the foreman asked me about theory on the lathe then I could explain the

functions. I have also learned about drawings and sketches - that you work from drawings on the lathe and interpret the drawings (R8).

Safety, also indexing a five -hole flange, rotary table, you don't mark it out but you draw it first on paper using instruments to set the holes out in degrees, the angle - that theory you learn in the classroom, then you apply it in the workshop (R10).

6.7.4 Motor Mechanics trade

In the motor trade, respondents recalled the theory topics that they could identify in their workplace practice as being: brakes, micing, bearings, wheel alignment, housekeeping, batteries and cam belt timing. Candidates were able to link theory to practice as illustrated by the following extracts.



Housekeeping - how to work safely, how to jack-up the car...lifting equipment, brakes....vehicle specifications, micing, how to use a dial gauge...we did it at the college and applied it in the workplace (R1b).

Yes! Testing a battery....the various tests, housekeeping, how to use tools, how to torque bolts. 80% to 90% of the theory we applied in the workplace.....it depends what work we get exposed to in the workplace. Maybe in a year or two we might do the actual work then I will have to go back to my workbooks or textbooks....like points and condensers. For instance a diff, I don't do at work, it gets sourced out. I

might do it at home and so also with the gearbox.....I have done that in my previous level test (R6b).

Across the four trade areas, responses about the recognition of knowledge that underpins the practical work in the workplace converged to large degree, as 97% of the respondents confirmed and could justify that they were able to relate theory learned at the college to the activities they were performing on the job. There was a high correlation between what was learned at the college and what candidates could apply and practise in the workplace, with their responses suggesting that they were able to make sense of this knowledge in their practice. Respondents differed on the range of theory sections that they could apply in the workplace, however, but there were indications that they could apply some of the precise concepts within their workplace activities. For example, a candidate said that in the design of the lean-to, he knew he had applied trigonometry formulae to construct the roof at the desired angle.

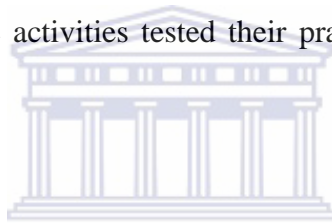
6.8 TESTING CANDIDATES' WORKPLACE KNOWLEDGE AND SKILLS

In line with the theme of applying institutional learning to the workplace, this area of questioning aimed to determine whether, overall, candidates felt their institutional knowledge and skills were being tested or practised in the workplace.

Table 6.8 Testing workplace knowledge and skills in the workplace

Testing/Practice of knowledge and skills in the workplace?	Respondents
YES	67%
NO	23%

More than half of all the respondents (67%) indicated that an expert or mentor, whilst observing what they were doing, asked questions relating to their activity. Fifty percent (50%) reported that workplace activities tested their practical application of the theory, as illustrated below.



Many times at the college they teach you, for example, up to 10 steps for how to do things theoretically, and then at work they would let you do the same thing in two steps. We take short cuts in the workplace because that is how we are taught to save time (R4).

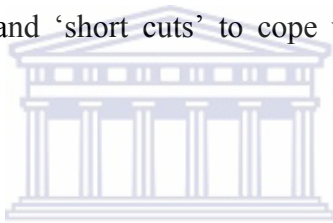
The foreman asked me to construct a five hole- flange. He had ‘his way’ and I had my method of how to do it from the college. I then showed him how to bisect, then he asked me why I did that, and I explained to him. He showed me another way (R8).

They would ask me, ‘how are you going to go about doing the job?’ He wants to know if I know what to do, and what to do first and what sequence I use to set the

things in. He does not say how or why you do things. If a job comes back then they ask, 'what did you do?' and from there a senior would say 'try this or try that'. At the college they test understanding.

They would explain easier ways of doing it. When you do a job they would ask how you did the job just to make sure that you were on the right track (R7b).

In these extracts it would appear that candidates could demonstrate their knowledge of the process, but application in the workplace needed shorter, faster processes which meant a different kind of application, and 'short cuts' to cope with the authentic demands of the workplace.



Some of the candidates, albeit fewer, reported having to 'explain' their knowledge of an action in the workplace, as follows:

Sometimes while you are testing something the artisan will say: "what are you doing there, what is happening inside of the thing that you are busy with now?" Then you have to tell him and explain the theory of how things actually work (R1a).

I guess that he tried to query my knowledge, he asked me how much I knew or understand. He asked me quite a bit about alternators, how the rectifier works, functions in regard to the diode in it... (R2a).

He has his moments when he asks but most of the time he watches you...observes you...they look at which part you replace to see if you understand...the foreman fills in the warranty, so he looks at the paperwork, then he questions why you replace a particular part. Then you have to explain so he can see if you understand (R9b).

6.8.1 Problem solving in the workplace

Still on the theme of application of college learning in the workplace, this question dealt with how learners were able to apply their institutional learning, and whether they could solve problems on the basis of the knowledge they had acquired at the college.

Two types of problem solving were probed: routine problem solving in the course of the regular activities exercised in the workplace, and non-routine challenges or unexpected problems encountered by the candidates, which might not occur frequently in their experience.

Table 6.9 Problem-solving in the workplace

Types of problems	Percentage
Routine	57%
Non-Routine	17%

While candidates as indicated above, dealt with both routine and non-routine problems, most problems encountered were of a routine nature where they could apply trade or domain specific procedures to solve them, as the following extracts illustrate.

When we work with batteries, especially the testing, also before we test we have to clean the parts, when you test a unit you follow a procedure of testing and then fixing and testing again (R3a).

The problems we solve are like non-starts, we check the batteries first, see if it is charged enough or flat...we turn the ignition key, if nothing happens then it is probably something to do with the battery or there is a loose connection or if the engine just cranks then it could be a loose connection..... (R2a).

We solve wiring problems, on a truck you have park lights on the top and bottom, but on that truck the bottom park lights did not work. We did all our checks, we went to the fuse box, checked the wiring... so we found out that that the wiring was damaged. We fixed it and the park lights worked (R4a).

When there is an overheating problem on a vehicle then you must do a procedural check to see the reasons for engine overheating. You do that by taking a pressure tester to see if there are any leakages, you do a pipe check, take out the thermostat (7a).

The operation of a pump requires a procedure - for instance the fuel is not pumping from the tank. The procedure to get to the right outcome must be followed. Also the timing if the vehicle is missing, you have to apply a procedure to set the timing (10a).

With the low pulling power I told the artisan that the problem could be that the fuel supply is not enough, and there may be a problem with the combustion ring because if there is not enough compression then there will not be enough power. Both the diagnoses proved correct and the truck was sent to the vendor to be fixed (R9a).

For instance brakes, someone strips the brakes then you have to solve the problem, or engine cut-off problems. You do a check starting from the accelerator....you do an elimination test....battery testthat is also part of problem solving (R10a).

At the college we were taught how to solve problems through the elimination process. It was procedural, a step by step process (R5).

I went through the whole procedure, I stripped this whole thing down. The spark eroder tool did not want to spark or weld. Because I drilled the water channels I was thinking that the water was not rotating to all the parts of the tool. So I fiddled around, I went back or referred back to the drawing (R10).

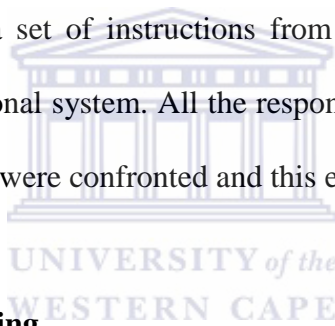
6.9 LEARNING OPPORTUNITIES AFFORDED TOWARDS BUILDING OCCUPATIONAL COMPETENCE

6.9.1 Evidence of workplace learning from critical incident journals

The reason for asking respondents to record critical incidents of learning in their journals, was to investigate the ‘learning moments’ that were significant for candidates during their time in the workplace, that is, what in their own estimation provided important learning for them. Respondents were asked to identify an issue that they had dealt with successfully in the

workplace after they had been there for some time. They were asked to describe and explain how they went about dealing with the issue and why they believed it was dealt with successfully. The data reveals a wide range of problems that candidates were required to solve, and which they perceived to be significant learning opportunities.

Responses converged on the need for a ‘systems check’ to determine the source or origin of any reported fault. The systems check was usually in line with workplace procedures, a fault finding technique. In one situation the respondent explained how he had to programme an injector on a luxury German vehicle using a computer. In another instance a respondent explained how by following a set of instructions from the supplier he had to repair and programme a satellite navigational system. All the respondents managed to deal successfully with the event with which they were confronted and this evidence is detailed below.



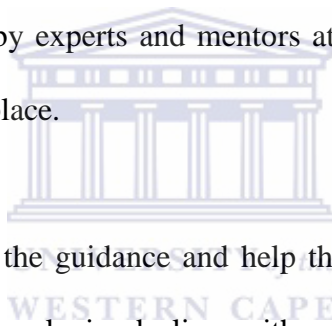
6.9.2 Successful problem-solving

Candidates reported that they had dealt with the problem by applying their knowledge of the procedures to first identify the problem, and then by following the procedures for resolving the matter. Of significance were the candidates’ perceptions of what assisted them to deal with the problem successfully, illustrated in the table below:

Table 6.10 Problem-solving assistance

What assisted you to solve the problem?	Percentage
College theory/training	58%
Practice/experience	42%
Experts/Mentors	53%

The responses show that three factors contributed strongly to candidates' ability to solve the problems they encountered in the workplace: their college theoretical training or knowledge of procedures; their guidance by experts and mentors at work; and their experience gained through practicing in the workplace.



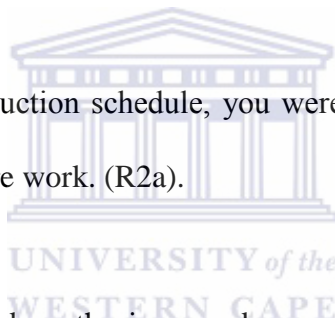
Respondents were agreed that the guidance and help they had obtained from their artisan/mentor/expert played a major role in dealing with workplace activities and challenges successfully. More than half of the respondents said that theory and training at the TVET college had been of assistance in solving problems whereas just under half of the respondents said that their practice on the job helped them to deal with the problems successfully. Over 50% of the respondents mentioned that the guidance of the artisan/mentor had played a significant role in dealing with the problems successfully while there were a few outliers who felt that fault finding techniques, workplace procedures, and a process of elimination had helped to deal with the problems successfully. What is significant is the fact that most of the respondents said that they had dealt with the problems successfully using a combination of

practical and theoretical knowledge, in addition to a significant amount of guidance from their mentors and expert others.

6.9.3 Practising knowledge and skills

All the auto-electrical trade candidates reported that they had, in their opinion, the opportunity to practise the main areas of knowledge that they had covered at the college. In particular the topics of alternators, starters, wiring, batteries, and ignition were mentioned. However, according to one respondent:

.....because of the production schedule, you were required to work a lot faster, you are exposed to a lot more work. (R2a).



Another respondent commented on the increased exposure they received when they were placed at specific vehicle vendors:

For trade-testing we have to do starters, ignition systems, batteries, wiring , alternators ... then the options are ignition systems and batteries... The vendors gave a lot of practice in doing the work activities relating to what we need to know for the trade test (R3a).

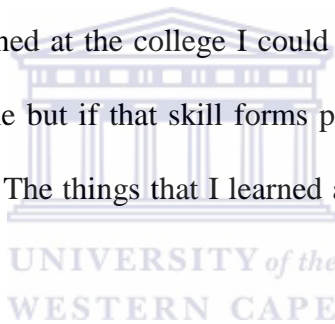
All the candidates in the auto-electrical trade confirmed that they had practised most of the activities required by the trade test, which they saw as an important purpose of learning in the

workplace.

Diesel mechanics on the other hand, reported more limited opportunities for practicing skills learned at the college, although they had practiced 'working with cooling systems, batteries, wheel balancing, valves, cylinder head and cranks'. In this instance the extent of their practice depended on what the workplace was dealing with at the time.

Fitting and turning candidates reported that:

The welding that I learned at the college I could apply in the workplace. We had to practice in our own time but if that skill forms part of your everyday activities then you can become better. The things that I learned at the college I practiced on the job (R2).



We practiced thread cutting separately and then applied it as part of our activities in the workplace. In that way we are practicing on real jobs. The more we engage in the thread cutting activities the more we become competent (R3).

You had to apply the skills learned at the college directly to the real work activities in the workplace. It is all about work (R5).

I could apply skills like tapping, drilling, measuring and the lathe, turning little parts - I made a key from steel on the job (R6).

Motor mechanic candidates also reported a range of practice opportunities, but some skills that were practiced at the college were not required in the workplace, as noted below.

Most of the skills that we do at the college we do in the workplace for instance, air-conditioning, electronic systems problems....they teach you at the college to look for the simple then to the complex. What you can't see you plug into the computer and check (R1b).

There are quite a lot of skills that we learn at the college but we do not practice it in the workplace. We mostly do services - before I just used to change the oil, replace the oil filter, fit the plugs (R6b).

Hand skills, how to use the tools, grinding machine, dial gauge, files, wheel alignment, servicing. There are many things that you do at the college that you don't do in the workplace (R7b).

6.9.4 Opportunities for building competence in the workplace

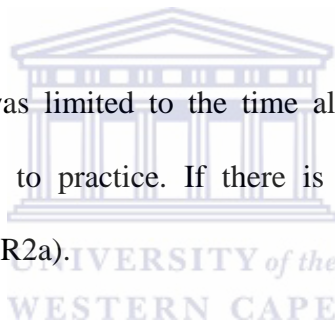
From the responses of candidates regarding their workplace experience, it would appear that practice is an integral part of productivity on the job, but without the opportunity for trial and error during their internships. Some respondents explained that because of lack of facilities to undertake particular jobs at their workplaces, for example on particular models of vehicles, work was outsourced to vendors, which resulted in better exposure to up to date skills. At

vendors, the 'production environments' exposed them to a wider range of activities and more practice time on the job.

Responses also indicate though, that time for 'off the job' practice and for trial and error was a luxury in the workplace, and many of them felt this limitation, as extracts below indicate.

I know that they have work that must go out so you get time to practise, only if they are not busy. I also try not to take too long otherwise I won't get time to practise something else (R1a).

The time to practise was limited to the time allocated for the job. There was no specific time set aside to practice. If there is free time then you might get an opportunity to practise (R2a).



There was a time limit. The servicing of the unit constitutes the practicing time and forms part of the working time. No separate time is set out for practising (R4a).

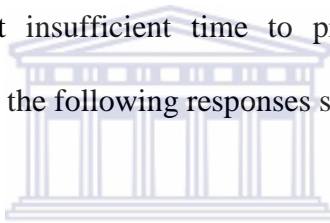
The time was limited to the time quoted on the job. We were shifted from section to section to be exposed to various activities and the time was limited (R9a).

You can't practise anytime when you want to practise. Say you get a job timed at two and a half hours and you feel that you can do it in 2 hours, then you use the half hour to practise. It is almost like practising on the job, it is not separate (R10).

Every job has a time limit.....you must make your target for the day so that they can see the money that is made for the day. Time is translated into money (9b).

There are things that we do a lot of, for example, differentials, gearboxes. You have more than enough time and opportunities at work to become competent, but then there are things that do not come up often like electronics (R1b).

Candidates conveyed that they needed more time to practise their skills in order to become competent, and anxiety about insufficient time to practise appeared to be related to preparation for the trade test, as the following responses show.



Time is running out to practise. We got our trade test coming up the end of the year and a large part of the trade test is concentrated on the alternators, we do not get enough exposure (R2a).

I don't think that I've had enough time or exposure to become quite confident - practice is very important (R4a).

There are eleven skills we do in the trade test but you do about five topics like problem solving, cylinder heads, differentials, gearboxes, airbrakes, wheel alignment, engine measuring, steering boxes. We do only servicing and brakes in the workshop though (R5a).

There was enough equipment to practise at the vendor but not in the workshop. I don't have enough time to practise the skills because I don't get enough of the jobs that I will be doing at the trade test (R10a).

There are things that we do a lot of in terms of the trade-test, but still if you look at steering boxes, we do it at the academy but not at work, because we do not get problems with steering boxes at work. It fluctuates a bit but yes, we have enough equipment (R1b).

6.9.5 Access to experts in the workplace: mentoring and coaching

It was clear from the evidence that the mentor or expert played a major role in the candidate acquiring competence. The majority of candidates, seventy seven percent (77%) explained that they were observed and coached whilst working on the job, which took the form of observations followed by questioning. Extracts from the data confirm this as below.

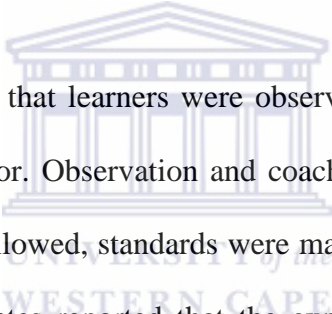
All the time, I always made sure that the artisan goes over whatever I have worked on and gives feedback. I ask him to double check, I am coached and guided while I practice (R1a).

The artisan watches all the time while we work, and they check your work afterwards to see if you put all the screws back, tighten things, otherwise he gets into trouble if something goes wrong (R2a).

They watch you and coach you. They explain to you how to do certain things and after that they do a job for you, they like you to see how to do it the right way, the way that they show you. They often give guidance at the vendors (R3a).

The artisan makes sure that I do it the same way as he does, therefore he will stand there and watch me all the time, to see how I am doing the job (R4a).

Yes! There is always somebody that you can go to. If the artisan sees you struggling then he comes and assists you or coaches you, otherwise he watches you (R5a).



It was clear from the evidence that learners were observed, coached and received ongoing guidance from the expert/mentor. Observation and coaching were concerned with ensuring that correct procedures were followed, standards were maintained, and that the job was done correctly. Many of the candidates reported that the experts demanded a high standard of performance from them, as the following extracts illustrate.

The artisan I work under is very sensitive about his work, even the cleaning of parts, if you missed a spot of rust he sends you back to clean it again. He says it won't make proper contact ...he expects the unit to look like new (R1a).

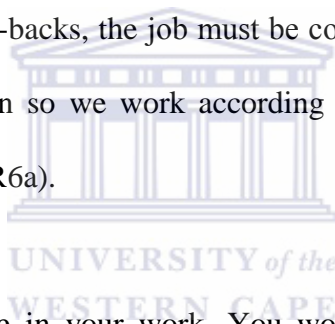
We had to work to certain quality standards. I aim for very high quality standards myself. It is normally expected of you do a good job, and it applies especially to

wiring. We heat shrink the wiring to get a good connection and we try to do a neat job (R2a).

When I had to fix the wiring, it had to be fixed properly. They do not want the customer to come back, so you must work to a good standard (R3a).

The artisan that I work with, he is very precise, so you must be very precise. You must take pride in what you are doing and you don't take things for granted (R4a).

There must be no come-backs, the job must be correct. It is a customer's vehicle and he is going to complain so we work according to workplace procedures, work on time, do quality work (R6a).



You have to take pride in your work. You work according to specifications and workplace procedures (R7b).

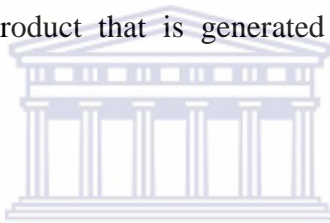
From the evidence it was clear that mentors/experts emphasized quality performance, little room for error, and customer satisfaction, therefore expectations of the candidate in this regard were high. The majority of candidates explained that assessment in the workplace consisted mainly of a visual check of what they were doing to ensure the correctness thereof. Some candidates mentioned a checklist that accompanied the job card signed off by management, as well as a report that had to be completed by the learner, as stated below.

The artisan only does a visual assessment of what you have done. They are experienced so they check everything. You don't do written tests (R9a).

Yes! They do the grid and take the job to the test bench. They have a check list and we write a report on the job (R10a).

We are not actually assessed, mostly an eye test, just by looking at the job (R6).

The assessment is in the form of checking if the job is according to the specifications of the drawing. The product that is generated by the press tool is assessed for correctness (R10).



He does it verbally by asking questions. He also road tests the vehicle after the service. There are sheets stapled to the job card that must be filled in (R4b).

They test drive the vehicle to assess if the vehicle has been fixed (R5b).

Visual tests to check for correctness or road tests performed on vehicles were common ways of assessing and in some cases the work was checked to see that it conformed to drawing specifications.

6.9.6 Candidate views on what they needed in the workplace to become competent

This question intended to ascertain what additional help candidates felt they might have

benefited from in the workplace to improve their competence, in spite of the affordances they had already mentioned. In this regard candidates reported that they valued the practice opportunity and work exposure, but that guidance and training was almost equally necessary.

Responses mentioned in particular were:

I need regular exposure to problems in the trade, guidance by the artisan or mentor yes, but it also depends on you (R2a).

For me to become good I need a lot of practice and exposure on the activities for the trade test. I need to practise more (R6a).

I think that I would like to be exposed to the things that I will do at the trade test in the workplace. The only way that you become good is through experience and by asking questions (R6b).

To become good, I think I need positive feedback after I have done the job. You are not going to learn if you don't get feedback. But if someone is going to keep on running you down then, you not want to learn, there must be encouragement from your peers (R8b).

Most respondents explained that to master the skills of their trade they needed a lot of practice and exposure to various types of work activities, especially activities that exposed

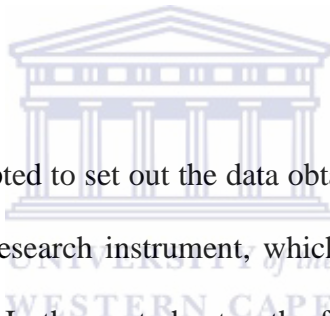
them to and related to the trade-test. However, the value of being able to relate theory at the college to the practice in the workplace was also noted:

The college is obviously a big help, but the mechanics are a big help....they know what they are doing, they are able to answer most of your questions...that is the help that I needed and I got it (R1b).

Respondents emphasised the need for the practice and exposure afforded by the authentic workplace setting, especially the access to expertise and experience.

6.10 SUMMARY

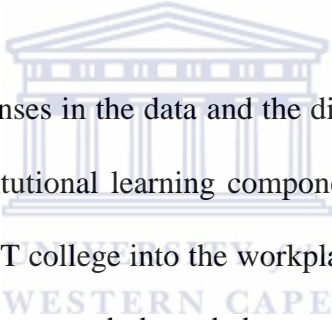
This chapter on findings attempted to set out the data obtained from respondents as faithfully as possible in relation to the research instrument, which was guided by the main research question and its sub-questions. In the next chapter, the findings laid out above are analysed and discussed in the light of the literature reviewed earlier herein, as well as being related to the conceptual framework that has been elucidated.



CHAPTER 7: DATA ANALYSIS AND DISCUSSION

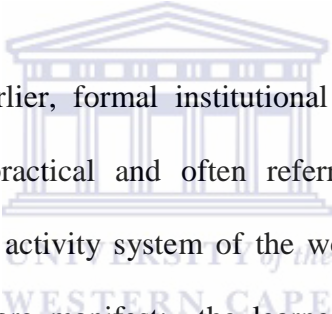
7.1 INTRODUCTION

The learning experiences of learners in the workplace from their own perspectives, and in their own voices, have been at the forefront of this research. Understanding how college learners experienced learning in the workplace, how they attempted to apply their institutional learning in the workplace, and the learning opportunities that were afforded them in the workplace towards building their occupational competence, have been focal points of this study.



Before engaging with the responses in the data and the discussions emanating therefrom, the policy environment of the institutional learning component was sketched, since learners in this study moved from the TVET college into the workplace. Mestre (2002:10) notes that the transfer of learning is the “ability to apply knowledge or procedures learned in one context to a new context”. During their period of training at the college the learners experienced learning in the classroom and college workshops for a period of up to sixteen weeks for each year of the apprenticeship, during which they covered all or most of the relevant trade-test schedule within their defined curriculum. In the final year of training, before completion of the apprenticeship contract period, the candidate would return to the college to complete a trade-test evaluation assessment followed by some ‘gap’ training before undertaking the trade-test. The successful completion of the trade-test serves as an indication of competence as prescribed by the criteria of the relevant SETA, in terms of which the learner is certificated as a qualified artisan.

The training period at the college consists of formal structured learning within a predetermined curriculum as prescribed by the relevant quality assurance body, outlining the content that is to be learned and how it is sequenced. Subject and assessment guidelines furthermore determine the curriculum rollout, and the roles and responsibilities of the various participants: learners, lecturers and workshop supervisors. The guidelines clearly spell out the applicable policies, and teaching and learning resources are determined by the curriculum. The college lecturer determines the appropriate pedagogy for delivering knowledge and skills to the learner.



In this study as explained earlier, formal institutional learning (largely theoretical) and workplace learning (mostly practical and often referred to as informal learning), are juxtaposed. However, it is the activity system of the workplace which is the focus of the study, wherein the following are manifest: the learner as subject, the objectives (the workplace learning activities); the mediating tools negotiated by the subject in achieving the objectives; the community of practice with its division of labour and responsibilities; and the rules that apply in such an environment (Vygotsky, 1978; Leont'ev, 1981; Engestrom, 1987). The activity system model was a neat 'fit' to aptly describe and explain the learning experiences of the learners in the workplace, the application of their formal learning in their everyday activities and the opportunities afforded them towards their becoming occupationally competent. In the view of the candidates this meant being able to deal with the impending trade test that would prove their competence on the job.

Themes from the data on candidates' experiences of learning in the workplace - on their everyday practices, the workplace pedagogy, the role of artifacts, the role of the expert, and problem-solving techniques were all prominent in describing and explaining how learning occurred. These themes will now be elaborated upon in some detail below, with reference to the literature and the conceptual framing.

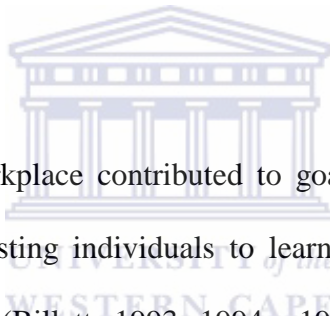
7.2 LEARNING THROUGH EVERYDAY PRACTICES

The learning activities reported by candidates were of ongoing interaction between learners and mentors or other experts. Lave and Wenger (1991) refer to these interactions as relationships between 'new comers' and 'old timers', between novices and experts, between individuals and artifacts, as was indeed the case in this study. Their everyday activities in the workplace provided opportunities for learners to expand their zones of proximal development (Vygotsky, 1978) by moving from a condition of needing assistance or being a newcomer, to doing work on their own. The situated nature of their learning provided learners opportunities to learn from and in the presence of 'communities of practice' (Lave 1990) in which they were largely learning through 'peripheral participation' (Lave and Wenger, 1991).

The occupations of motor mechanic, diesel mechanic, auto electrician and fitter and turner respectively involve knowledge, skills and technology that require high conceptual knowledge as well as practical workplace knowledge. The learner's everyday activities in the workplace were seen to involve dynamic interrelationships between social, cultural, technological and linguistic practices that afforded the learners opportunities to learn. Cultural Historical Activity Theory (Vygotsky, 1978) emphasises the value of mediating

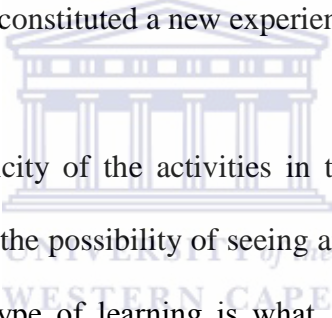
artifacts in the process of knowledge acquisition and distribution, a phenomenon clearly experienced by the candidates as they drew knowledge of processes and procedures from manuals, prototypes, audio visual and diagrammatic tools.

The learners experienced the workplace as a dynamic environment where ‘the work had to get done’. As some candidates pointed out, “it’s about production....because of the production schedule, you are required to work a lot faster, you are exposed to a lot more work” (R2a). The authentic environment of production had its advantages in that it provided more exposure to repeat activities or practice that gave learners confidence and could lead to mastery of the job.



Everyday activities in the workplace contributed to goal-directed activities and supported what was instrumental in assisting individuals to learn new work-related knowledge and strengthening of that learning (Billett, 1993, 1994a, 1994b, 1996; Harris & Volet, 1997). However, the findings also indicated that candidates found learning in the workplace to be somewhat different to how they experienced learning at the college or academy. The knowledge appeared ‘new’ to them, they explained, because at the college they mostly learned from a simulated environment which consisted of ‘dead’ artifacts, whereas in the workplace they had to adapt to a dynamic environment which they spoke of as ‘real learning’. In the workplace, learners were privy to authentic learning experiences (Brooker et al., 1997) which they had not found to be the case in the college environment.

Engagement in authentic work activities thus contributed significantly to constructing and learning ‘new’ work-related knowledge (Billett, 2000). A learner explained that at the college, wiring the lights of a vehicle was simulated on a flat board, whereas in the workplace one had to rewire the lights on a vehicle whose wires were completely burnt out. Machines in the case of learners in the fitting and turning trades were functional and operational and part of a production activity, similarly in the case of learners in the motor and diesel trades, engines and gearboxes were mounted in vehicles belonging to customers. One learner remarked that at the college one worked on engine components as single units, whereas in the workplace the units formed part of the whole, for instance in a running engine, an aspect of the learning which constituted a new experience.



Candidates valued the authenticity of the activities in the workplace above the simulated environment in the college, for the possibility of seeing and understanding the world as a set of interrelated systems. This type of learning is what Avis (2004:211) refers to as “real learning which takes place when it is acquired in the context where the resulting knowledge can be practically used”. The everyday activities in the workplace provided learners the opportunity to view things in a holistic way as well as in context. Everyday activities provided rich opportunities to practice and develop new skills and knowledge and learners clearly valued this experience.

Over ninety percent of the respondents acknowledged that they had, in the workplace, recognised theory learned at the college. Due to the very high correlation between what was learned at the college and the activities in the workplace, they were able to make sense of

their practice. In the everyday activities of the workplace, candidates were confronted with many instances which required problem solving, and an integration of knowledge and skills, where they could apply their institutional learning in a variety of situations, as was evident from the critical incidents that were recording in their journals by the candidates. These were situations in action which required diagnosis and solution. Situated learning in this study allowed candidates to apply their knowledge in the workplace as a way of reinforcing and strengthening their previously obtained theoretical knowledge (Billett, 1994). Candidates were largely successful in solving the reported incidents. Firstly, the findings showed that fifty eight percent of the learners could diagnose the problems correctly on the basis of their theoretical knowledge. Procedures and processes learned at the college enabled them to trace the faults which made it possible to take the appropriate action. Candidates revealed they were able to reflect on what they had learned and practiced at the college, and apply that learning successfully in the workplace, regarding repetition and practice as a way of embedding knowledge for work. Their communities of practice assisted in their knowledge construction, appropriation and application in their everyday workplace activities. Critical learning moments recorded showed that correct diagnosis and application of knowledge was complemented by the guidance of expert others. Most of the candidates reported being ‘tested’ by the mentor or expert whilst being observed, through being asked questions relating to the activity.

The problems encountered by candidates were specific to their trades, and they used their domain specific knowledge. For instance, in the auto electrical trade the problems encountered were in line with trade-test requirements like a battery not charging, a vehicle

non-start, faulty lights and damaged wires. According to the responses of the learners, they arrived at the solution to the problem by applying the procedures they had learned at the college, which entailed tracing the origin of the problem and using a step-by step process to hone in on the problem. In the diesel trade, problems concerned batteries, brakes, sluggish performance of vehicles, engine stalling or engine cut-off, and these were solved by a process of elimination to identify the fault. In some of the situations artifacts assisted with problem solving, for example, using computers with diagnostic software which assisted fault-finding processes.

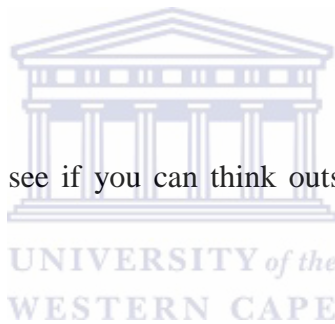
Though workplace knowledge has both a tacit and explicit dimension, most learners could describe and explain how they went about solving the problems which they were confronted with in the workplace. They were able to identify and relate work practices to theory learned at the college, apply the knowledge where necessary, and with assistance and guidance from their mentors, using artifacts and consulting experts, arrive at solving the problem. Moreover, they could for the most part explain to their mentor how they had gone about doing so. 'Knowledge of how things are done', according to Cohen and Bacdayan, (1994: 554) has a cognitive and motor (doing) dimension and therefore, 'when an action can be explained by an individual, explicit procedural knowledge has been applied' (Guzman, 2009).

To illustrate, a respondent mentioned designing a food container which had to be conceptualised from starting idea to its final stages (R2); another mentioned two tapers that had to fit with precision, using mathematical calculations (R3); while a third explained how he had to widen the rim of a tractor wheel which involved precision cutting on a machine and

inserting a piece by welding (R8), all of these being problem-solving activities involving ‘both head and hand’ as alluded to by Gamble (2003). Candidates explained how they manipulated problematic situations, evaluated problems in the workplace, and solved them by integrating institutionally acquired knowledge and skills acquired at college into their practices in the workplace (Anderson, 1993). Many of the problems that had arisen, occurred without prior warning and had to be dealt with as they happened, a hallmark of situated learning (Nardi, 1996).

Candidates were also given the opportunity to solve problems by themselves, stating reasons for this as:

The company wants to see if you can think outside the box and can you use your knowledge (R3).



The lead artisan wanted to see if we could ‘think for ourselves’ and if we could do the task. Where necessary he would assist. He would throw the ‘ball in our court’ (R8).

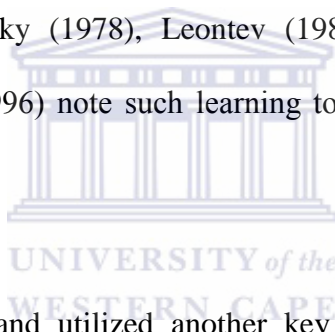
It is expected of you to solve problems, you may also have an opinion, but you must also prove that you have the ability to solve the problem (R1).

It was clear from the evidence that the range of everyday practices to which candidates were exposed, enabled them to derive significant learning whereby they were able to integrate theory into their practice, and where they recognized that their practices were being informed

by theory. The following section discusses the pedagogy of the workplace, that is, the methodologies and techniques by which teaching and learning occurred.

7.3 LEARNING METHODOLOGIES IN THE WORKPLACE

The data showed that the workplace provided learners with plenty of opportunities to access knowledge through observation of the mentors and experts at work. Learning through observation, and asking questions about what was observed, were means of accessing what might often remain tacit knowledge held by the expert alone. Learning by observation, and a ‘question and answer’ method emerged as dominant pedagogies in the workplace. Socio-cultural theorists like Vygotsky (1978), Leontev (1981), Engestrom (1987), Lave and Wenger (1991), and Nardi (1996) note such learning to be ‘contextually rich’ methods of knowledge appropriation.



Candidates also experienced and utilized another key method of acquiring practical or workplace knowledge, namely, ‘learning by doing’ (Dewey 1963). The findings showed that not only was this an often used methodology for learning experienced in the workplace, it was also, in their own opinion, the candidates’ preferred methodology. Learning by doing provided learners the opportunities to practise in spite of the limitations on time for doing so. Some learners reported having started with simple tasks and gradually moving on to more difficult jobs: ‘I was guided from my first year, now I am able to work on my own. The artisan took a step back’ (R1b).

This kind of learning illustrates what Lave and Wenger (1991:37) refer to as legitimate peripheral participation, where after initial learning at the periphery, candidates become more competent and become more involved in the main processes. The journey towards full participation in communities of practice according to Lave and Wenger includes learning knowledgeable skills” (ibid: p.29). Candidates observed and listened to experienced colleagues, later imitating their behavior (Aarkrog 2005). In the words of one of the candidates, ‘I interacted with everybody that is part of that workplace. You get a lot of experience like that listening to them’ (R7a).

Learning by doing, repetition, and trial and error were perceived as contributors towards building skills, and this experience developed, shaped and moulded the expertise of learners. According to a candidate, knowing only the theory of how to do something is devoid of substance, whereas understanding is developed by doing the work oneself: ‘...once I get used to doing it myself then I will be able to understand why it is they are telling me that I must do it in that way’ (R4a). By observing how the mentors and experts performed certain work functions, learners made it their own, as one learner put it, ‘you steal with the eyes’.

Furthermore, there was extensive evidence of the use of artifacts as mediating tools within the work environment, for instance: ‘There are different models of vehicles that we can use as examples...I went to a similar model, took that and tested it on the original vehicle and it worked’(R1b). Formal learning resources such as manuals, texts, videos and interactive computer technology (ICT) particularly in the automotive trade, served as guides in the everyday activities of the learners. Artifacts such as workshop manuals, texts and computers

provided important data and specifications for candidates in executing their work, expanding their knowledge and skills. Artifacts also gave access to information on procedures for getting the work done with minimum risk of come-back, and provided a means of complying with workplace practices and procedure. Billett (2000:7) notes that the physical workplace environment provides “important clues, cues and models that assists individuals thinking and acting and hence their learning and understanding”.

The findings showed that learners were exposed to a variety of learning opportunities in the workplace such as observing others; learning through socializing with others; being guided; reflection; figuring things out for oneself; working with peers, and practicing the skills learned in the workplace. This constituted the workplace pedagogy, a way of distributing knowledge and skills to learner. Learning by doing (Dewey, 1963; Kolb, 1984; Young, 2005) was, in the experience of the learners, a “significant or valid, but small and decreasing feature of workplaces and therefore of vocational education as a whole” (Young, 2005: unpaginated). Young however critiques learning by doing as having limitations, since occupations such as engineering might require access to knowledge that cannot be acquired in the workplace.

What was significant about findings related to the pedagogy of learning in the workplace was the interrelatedness of methodologies which the candidates found benefited their skills development. In addition, the workplace environment gave the exposure to a community of practitioners, as the next section outlines.

7.4 LEARNING IN COMMUNITIES OF PRACTICE

The workplace experienced by the learners in this study was a dynamic environment, an arena involving artisans, technicians, apprentices, support staff, as well as communication systems and work processes, the combination of which is referred to by activity theorists (Vygotsky, 1978; Leon'tev, 1981; Engestrom, 1987) as a collective activity system. Learning was experienced in day to day social engagement with communities of practice where candidates discussed work problems, brainstormed problematic issues, and experts gave input regarding their experiences in similar situations. Candidates explained that they needed to ask how to do things, how things worked, to obtain guidance, to learn from the experiences of these experts, to share information about work, and to gain more knowledge. Their interactions provided opportunities to learn new knowledge and skills in undertaking the various tasks and activities assigned in the workplace.

It was evident that their interactions with other experts had assisted in the learners' acquisition of knowledge. Discussions and interactions with other role-players in the workplace involved problem-solving, brainstorming problematic issues, and listening to the experience of mentors and experts who had many years of experience in the specific trades (R6; R7; 7a). For instance a respondent reported that:

I interacted with my mentor and others, where discussions take place out of which I might learn. They are willing to share information (R6).

Another explained:

When there are problems then we interact with each other, we brainstorm the problematic areas. So we solve problems in a group, everyone gives an input (R7).

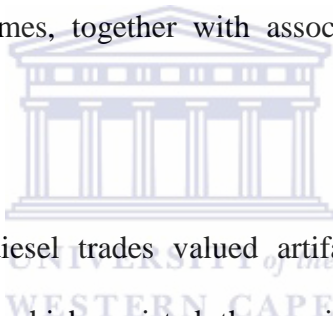
Although at the outset of their apprenticeship they had started with simple jobs like services on a motor vehicle, they were enabled through their work experience to do many tasks by themselves, as a respondent explained: “I was guided from my first year, now I am able to work on my own...” (R1b). This exemplified what Lave and Wenger (1991) referred to as the learning of knowledgeable skills through a social process (Lave and Wenger, 1991: 29).

The findings confirmed that most of the learners moved from legitimate peripheral participation to full participation (Lave and Wenger 1991: 37) by listening to the experts, asking questions, observing what the mentors and experts were doing and, and then practicing towards mastery of the job. Despite the dominance of methodologies of learning such as observation, demonstrations, asking questions and doing, learners valued their engagements with their mentors and experts and the verbal guidance emanating from such engagements. As mentioned in the literature review, Lave (1995) conceives learning as a natural process that occurs when individuals participate in communities of practice in the workplace where they become knowledgeable and develop skills which enhance their identity within the circle of more experienced artisans and other experts. Being in such communities according to Lave (1991), motivates, shapes and gives meaning to learners in

their journey to becoming qualified and successful artisans. Learner feedback was dominated by this kind of learning.

7.5 THE ROLE OF ARTIFACTS

Candidates' learning was significantly enhanced by their access to a variety of artifacts in the workplace. The findings indicate that they had access to formal instructional materials such as computers and videos, texts, manuals, drawings, duplicate parts, donor vehicles and machines to support learning. Conole (2008) explains though, that mediating artifacts also include language, pedagogical approaches, and tasks the students are required to do in order to achieve the learning outcomes, together with associated tools, resources and outputs (p.192).



Learners in the motor and diesel trades valued artifacts like the computer diagnostic machines, texts and manuals which assisted them with fault finding procedures to be followed and provided important specifications to be adhered to when working with vehicle engines. Most new vehicles with high tech engines and systems are managed by onboard computers which do not respond to conventional visual methods of fault finding. On-board computers monitored the vehicles' interactive mechanical, electrical, hydraulic and electronic systems and could be plugged into the vehicles with specialised diagnostic software (R4b; R7b; R8b; R9b). A respondent reported:

When the computers on the vehicle become problematic, you plug the GDS computer into the vehicle, check the trouble codes, from there you check the manuals

on how to repair (8b).

Fault finding and procedures for corrective action were immediately available to candidates via artifacts such as donor vehicles and duplicate parts which assisted them by allowing practice in a safe space without risk to the clients. Learners valued these artifacts as they provided realistic visual assistance when they needed it.

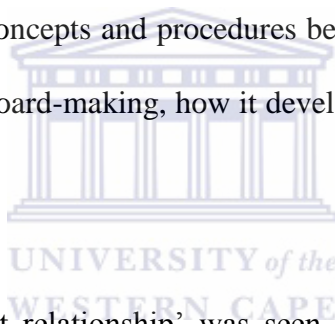
Furthermore, mediating tools such as texts, videos, integrated computer technology (ICT), manuals and models were embedded in the practice of the various trades in this study. Candidates found that fitting and turning, auto electrical, diesel and petrol trades made use of drawings and sketches as a means of communication through which, graphically and symbolically, drawings provided an accurate blue-print of an object or product to be manufactured, showing detailed descriptions of components in minute detail. Drawings were also used to provide an accurate and detailed layout of complicated electrical and electronic circuits found in machines or vehicles. Auto electricians were able to use drawings to trace faults in sub-systems of motor vehicles.

Candidates often experienced practical knowledge or tacit knowledge being made explicit, through demonstrations and drawings. Drawings linked practical knowledge to explicit knowledge - what was presented on a flat piece of paper had to be conceptualised in the mind, hence the tacit practical workplace knowledge was transformed into explicit knowledge via higher order or abstract thinking. A respondent confirmed as follows:

The mentor often used drawings, which is the simple way of explaining things to you, to make you understand. He also demonstrated things to me, for instance, when railings have to be welded, then he would weld first, however he first explains the current settings (R1).

Another respondent said:

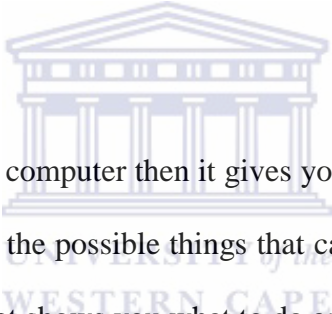
We use drawings which we get from the computers. My mentor used drawings to communicate certain concepts and procedures because for a time I could not fathom the whole concept of board-making, how it develops from the start to finish i.e. from ‘paper’ to ‘box’ (R7).



Knowledge of the ‘whole–part relationship’ was seen to be grasped visually rather than through formal reasoning, talking, reading and writing (Gamble, 2002). Conole (2008) agrees that drawings as artifacts ‘provide visual representations which give an indication of the structure and flow directions of an activity’.

Candidates found themselves engaged in activities to figure out how to solve the problems at hand, and were often in need of guidance. If direct guidance was not available due to work production pressures on the experts, candidates then looked for clues, as in cues and models to assist their learning and understanding (Billett, 2000). Such artifacts contributed significantly to candidates’ mastery of their tasks in the workplace.

In the hands of competent instructors the use of the artifact was enhanced (Jonsdottir, 2007), and everyday activities in the workplace could be linked to higher levels of scientific and conceptual knowledge as shown by Bhyat (2011). As Engestrom (1994) holds, the deeper scientific knowledge embedded within the artifact could remain hidden from the learners unless made explicit through instruction. Even though mentors in the workplace did not always directly use artifacts as mediating tools to instruct candidates, they in most cases referred them to such artifacts as would assist them to do the job correctly. A respondent explained as follows:



All the cars are put onto computer then it gives you a fault. So when you double-click it gives you a list of all the possible things that can go wrong and from there you go to the other computer that shows you what to do and how to do it (R6b).

Candidates had to make sense of what they saw, and it could be concluded from the findings that learners benefitted greatly from the indirect instruction in the workplace environment via artifacts.

7.6 THE ROLE OF THE EXPERT

In spite of the prevalence of an array of learning methodologies available to the candidates in the workplace, what emerged unequivocally from the research was the learning that was acquired through engagement with the ‘expert other’. This concept of ‘expert other’ locates

itself within Vygotsky's (1978) Zone of Proximal Development (ZPD) as mentioned elsewhere in this thesis, and emphasises the intervention and guidance by a 'teacher' (Engestrom, 1987) in the learning process, using mediating tools and structured activities that are object and goal oriented. The study shows that candidates were not left to their own devices in the learning process but were supported by being in the presence of a mentor, a 'teacher' or 'expert other' who through their engagement provided guidance to these newcomers.

The findings indicate that in most instances guidance given was verbal, or as the literature would aver, learning was 'socially distributed using linguistic and other mediating tools'. Candidates experienced close individual contact with the experts in the workplace, proximal situations in which experts could explain, coach and model or demonstrate practices and processes. The candidates' understanding of the culture of their activity systems was enhanced by this close individual contact with their expert 'teacher'. This individual contact took place within a collective activity system as illustrated below, where the role of the mentor/ expert provides the support base for the learning 'space' or domain:

Fig 4: How the findings depict the Collective Activity Theory System

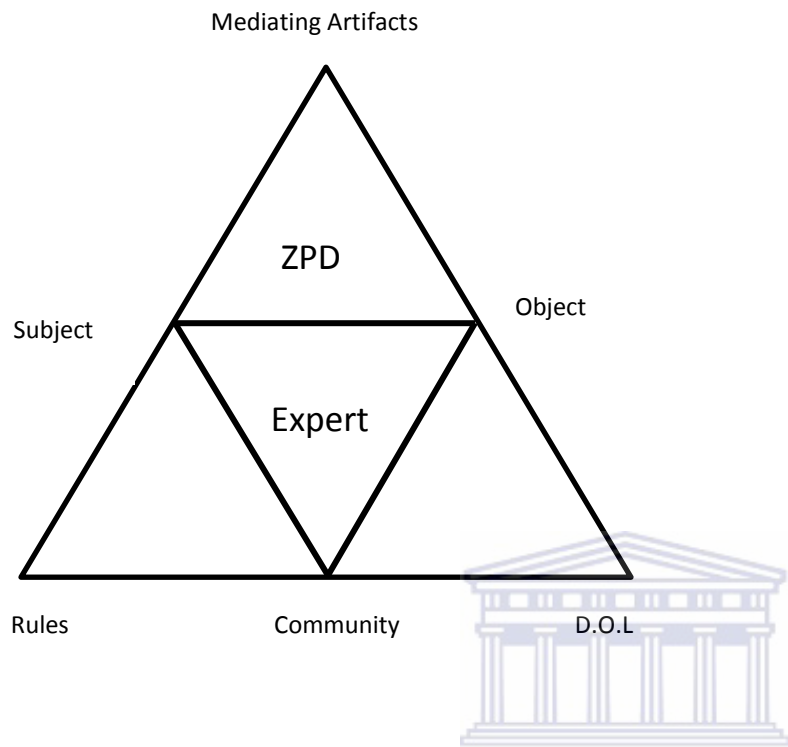


Figure 4 depicts Engeström's (1987) Collective Activity Theory System which, on the basis of the findings herein I have amended to show the central role of the expert as operating across two fronts, namely: within Vygotsky's (1978) ZPD where the effects of proximal or direct guidance is felt strongest, and in Lave and Wenger's (1991) Communities of Practice where the engagement with candidates might be indirect and distal, or further.

This study showed the expert other playing a key role in mediating the subject's learning, through application of artifacts and direct or indirect guidance. Far from a 'sit by Nellie' approach which had often been used pejoratively to describe the way apprentices learned in the past, these novices engaged extensively with the experts. The evidence indicated that candidates looked to and trusted the advice of the experts in the workplace: "I interacted

mostly with my artisan because I want to understand my trade, so I asked a lot of questions” (R4a); and “I interacted with them to get more knowledge - I would go to the guys and ask them what they are doing, what is wrong” (R9a).

However, learning from mentors and other experts in the workplace did not always involve being directly guided, often there was indirect guidance based on the observations made and the questions asked by the candidate. A respondent in the motor trade illustrates this as follows:

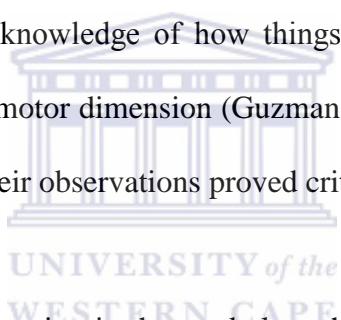
Learning the skill comes by doing the activity yourself over and over and so you get the necessary experience however, as indicated one has to know why you do things and this understanding comes about by questioning the expert (R7b).

This candidate valued learning by doing and practice (Dewey, 1963) but recognised that practice alone was not enough – the understanding needed to be socially acquired through linguistic processes (Nicolini et al., 2003). What emerged time and again as a fascinating phenomenon was that learners believed they could learn ‘by doing’, however they kept discovering that the affirmation of the expert was needed to confirm their learning. A learner expressed this as follows:

... by doing the work physically, practically, it gives me understanding, by asking questions, by watching them. Somebody can tell me over and over how to do something, but I might not be able to apply it with my hands, once I get used to doing

it myself then I will be able to understand why it is they are telling me that I must do it in that way....I would also like to do something under guidance in case I make a mistake (R4a).

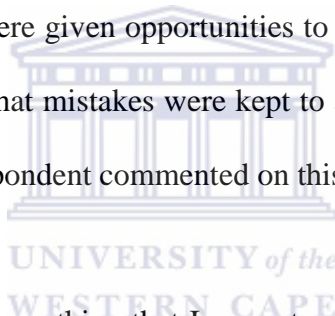
Practical knowledge according to the literature is best acquired through a combination of listening, observation, asking questions, modeling and doing. Learners placed much value on doing the work themselves, saying they gained experience when given the opportunity to practice (Dewey, 1963). Undoubtedly practice made them feel more confident, but in spite of their focus on their own practice, they kept an eye on the expert and desired to perform the tasks under guidance. While 'knowledge of how things are done' (Cohen and Bacdayan, 1994:554) has a cognitive and motor dimension (Guzman 2009), these novices needed to see how the experts worked, and their observations proved critical to their learning.



Due to the situated nature of learning in the workplace the candidates had access to a range of learning interactions, including access to the expertise of others through their mentors, other technicians and supervisors. This direct and indirect access to communities of practice provided opportunities to acquire applied knowledge and skills through real work which was structured and goal-directed (Engstrom 2001). The mediation by experts in the workplace was critical in bridging the gap between theory and practice, or between horizontal and vertical knowledge (Engstrom 1994). Brown and Keep (2000) aver that high-level performance of an employee can only be determined when thinking skills, critical reflection and the transfer of knowledge are observed in the workplace, or as Harkin (1997:46) clarifies, 'skills... can only be developed in a lengthy process of practice, in demanding and

realistic situations’.

All of the candidates in the study interacted extensively with their mentors and with other experts and often received direct verbal guidance and explanations on the job. In addition, many experts modeled the work activities in order for novices to see how things are done. Learning through observation, demonstrations and listening to others might be argued by some as non-intentional learning, however (Billett (2000) holds that it contributes directly to the development of competence when candidates are engaged in these ways. Candidates were convinced that they learned and developed both knowledge and skills for performing their tasks. There were those who were given opportunities to work on their own, but the mentors kept a watchful eye to ensure that mistakes were kept to a minimum and to ensure that there would be no comebacks. A respondent commented on this type of guidance as follows:



They talk to me about something that I am not supposed to do, or there is something that I was supposed to do that I am not doing. Sometimes they show me, demonstrate to me, it is easier than explaining (R6a).

Expert guidance involved discussions on problem-solving, sharing information, listening to expert knowledge and insights from the experience of the mentors and experts, for instance:

I get guidance...the mentor would demonstrate or explain if I have problems with the job. He also explained that if you confront a problem then you take a mental picture

because you have to re-assemble a job. When I am finished I call the artisan to come and check (R9).

Direct interpersonal guidance and actual workplace practice in terms of achieving goals and solving problems were highly valued by candidates as ways to enhance their learning. Modeling and demonstrations were means of showing novices the ‘what’ and ‘how’ of their tasks. In this way, what might have remained the tacit knowledge of the expert was made explicit through direct guidance. Candidates’ everyday activities in the workplace benefited from such interaction with experts, and its potential to lead to mastery of the job (Lave and Wenger, 1991). Since candidates had to be productive in the workplace they learned easier ways of working more efficiently. This they referred to as ‘short cuts’, clearly the result of experience gained over the years which were part of the experts’ ‘tacit knowledge’:

Sometimes the artisan would say, no - you can’t work like this, you must work like that, the easy way to do it is like this...he showed me and then he made me do the job (R3a).

Another respondent amplified:

These experts who have a lot of experience tend to at times find it difficult to explain to someone who does not understand, so you must watch him closely, they know the shortcuts and the tricks to save time (R1).

Some respondents alluded to the fact that in the workplace it was all about work and production, and that one had to conform to the 'culture of the workplace' (Brown et al., 1989). Guidance from mentors and experts was thus critical to learning the ways that worked in practice. Candidates felt reassured that they were allowed to work by themselves under the watchful eye of their mentor to ensure minimum mistakes.

While learning in the workplace was dominated by observation, questioning, demonstration, and practice, none of these methodologies could be performed in the absence of the expert other, without the watchful oversight of the mentor, and without artifacts as additional affordances. Direct guidance from experts provided information and knowledge that learners might not have had access to simply through observation and practice on their own.



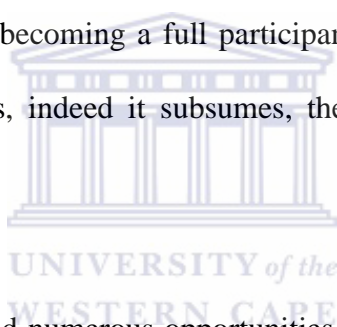
7.7 SUMMARY

Ninety seven percent of the candidates were able to access guidance and assistance from their mentors and expert others in the form of social interactions where the objective was to share information and learning about work. In addition to gaining understanding of the trade by asking questions, interactions involved problem-solving and finding solutions specific to the situations encountered.

Candidates were not passive receivers of knowledge but were socially engaged with more experienced others (Lave 1995), and were involved in finding solutions to the situations as they occurred. They were fully engaged in problem-solving activities out of which they learned and acquired knowledge, and in many instances, problematic areas were

‘brainstormed’ in groups. Learning as social engagement in terms of situated learning and activity theories was evident. Dynamic interactions between candidates and expert others in the workplace for purposes of obtaining guidance were a strong indication of what Lave and Wenger (1991) describe as the relationship between the ‘new comers’ and ‘old timers’. Through these relationships learners moved constantly from legitimate peripheral participation into (almost) full participation (Lave and Wenger 1991:37) in the socio-cultural practices where knowledge and skills were acquired, through a process where:

a person’s intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice. This social process, includes, indeed it subsumes, the learning of knowledgeable skills (ibid, p.29).



The candidates in this study had numerous opportunities to tap into the vast knowledge and experience of their communities of practice. They indicated that for many of them the transition from an institutional, simulated environment to the authentic, real workplace environment was a new experience. Encountering high-tech engines and industrial machines for the first time was indeed daunting for many of them. When they were asked what had helped them to learn and deal with the new challenges, more than two thirds agreed that guidance from expert others who might be mentors, technicians, supervisors and so on, had contributed significantly to their knowledge and skills acquisition and learning about work, whether through direct (proximal) or indirect (distal) guidance, which a candidate articulates as follows:

He just gives me the work then he guides me from a distance. He demonstrates and explains verbally...they basically watch me while I do the work and whenever I go wrong the mentor would say 'don't do it like that' (R6b).

The type of input afforded learners by expert others in the workplace was indeed a far cry from 'sitting with Nellie' where apprentices in the past spent many hours simply observing. Dewey's 'learning by doing' remained significant from the perspective of these candidates, as the findings showed.

Vygotsky's (1978) Zone of Proximal Development emphasises the value of intervention by a 'teacher' in the learning process, using mediating tools and structured activities that are object and goal oriented. Some candidates in this study, though appreciative of the affordances for learning in the workplace, valued structured learning which they likened to that found in the traditional classroom environment where activities are planned and goal-directed, however the fast-paced environment of the workshop floor did not always allow for that. Activity theorists and psychologists such as Vygotsky, (1978) and Leont'ev (1981) support the extent to which learning occurs through social situations and interaction but say this can be further advanced through structured teaching and learning. Candidates in this study interacted with their mentors and other experts and valued their guidance, however, such interactions stemmed mostly out of situations of observation, demonstrations, trial and error, and verbal guidance. In the experience of these candidates practical knowledge was being learned by 'getting one's hands dirty' (Gamble, 2004), and, as Suchman (1985:21) argues, in situations where learning is embedded in the situation.

Mentors and experts in the workplace focused predominantly on actions to ensure that the work was done correctly, and made it clear to candidates that the onus of 'learning' was on them (the candidates) as in the words of a mentor, 'you are here to learn, so you have to do the job of learning' (R10). Engestrom (1994) cautions that an 'adaptive' learning approach like conditioning and imitation, where the learner focuses only on copying readily available correct behaviours, might be a limiting factor for learning. While this was by and large not the case here, there was also an appeal for more structured learning to be made available in the workplace, albeit within a production environment, so that more opportunities for practice 'off the job' could be obtained. In order to successfully integrate practice and theory there needs to be alignment between 'what' is done, 'how' it is done, and 'why' it is done, that is, a link should be established between theoretical (formal) and practical (informal) learning. Applied to the workplace, solving problems requires an understanding of the problem, making a diagnosis of the nature of the problem, and then applying the knowledge and skill to solve the problem.

Young (2005) argues that the link between formal and informal learning is critical, which Griffiths and Guile (2003) refers to as the notion of connectivity. In this regard the findings indicated a very high correlation between institutional learning and practice in the workplace. Candidates, although recognizing some theory sections more strongly than others, indicated that they were able to apply a substantive amount of theoretical knowledge to their everyday activities in the workplace which, as one respondent explained, depended on what activities and situations they were exposed to in the workplace.

There can be little doubt that practice in the workplace was underpinned by theoretical knowledge as most candidates confirmed that they were able to relate their activities to the college theory they had learned. Links were seen to be made between head and hand (Gamble, 2003), and from the findings it was noted that activities in the workplace were not done in isolation of the theory. Candidates had the opportunity to develop an understanding of the ‘what’ and ‘why’ of their actions in the workplace, as one said, ‘when you do things in the workshop then you always reflect on what was done at the college...what I have done there....and then I apply it in the workplace’ (R6). The responses of candidates concurred with Polanyi’s (1967) definition of skill as being ‘knowledge in action’.

Candidates reported that they could see the alignment between what they had learned as theory, and the practical activities in the workplace, bolstered by the artisan testing their understanding by asking questions while they were performing a particular action:

He (the expert) wants to know if I know what to do...what to do first and what sequence you use...how or why you do things (R6b).

Candidate responses indicated that doing things procedurally correct was important in the application of practical knowledge in the workplace. Following the correct procedures was a way of ensuring that there would be minimum mistakes or risk of vehicle ‘comebacks’. The mentor’s focus was on testing learner’s practical know-how in the workplace, and their workplace experience enabled learners to give an account of their activities (Cohen and Bacdayan, 1994), confirming that context-dependent knowledge is tied to the ‘real world’ of

human action and has ‘a combination of both process and procedural knowledge’ (Gamble, 2004a). The line of questioning by the mentor was to ensure that the step-by-step processes followed were in line with work practices and that the work was done according to the culture of the trade. As averred by Nicolini et al. (2003), ‘knowing is a form of social practice that involves knowledge in action situated in the historical, social and cultural context, and embodied in a variety of forms and media’ (p.3).

The designated trades in this study are known for their procedural, domain specific knowledge that underpins the execution of trade specific activities. Candidates reported that the way in which they had been taught at college was the systematic way of doing things, deemed to be the ‘safe’ way, without posing unnecessary hazards or possible injury to persons. Although novices were required to follow certain protocols to ensure compliance with the ‘rules’, they quickly also learned the ‘short cuts’ that experts had developed through practice, and adopted these while in the workplace.

Problems were dealt with through a process of elimination and applying efficient methods of working that had been developed over time, expressed in handbooks, rules or company-specific codes of practice (Young, 2005: unpaginated). Even though college texts or theories might not easily be applied to the authentic situation in the workplace the procedures learned at the college was a systematic approach. However, much of the tacit knowledge in the workplace had to be made explicit through learners connecting their principled or propositional knowledge with activities in the workplace, or with the ‘knowledge of how things are done’ (Cohen and Bacdayan, 1994: 554). Bhyat in his study (2011) showed that

the general and the particular could be connected when taught in a structured way using formal and informal learning, and that the latter did not necessarily exclude the former.

Candidates in this study aspired to qualify as competent artisans ready to take their place in the world of work. In order for them to be found competent in the trade test they needed exposure to an abundance of learning opportunities that might enhance their occupational competence. Maximum exposure to work activities was viewed as a way to enhance knowledge and skills acquisition and that sufficient on-the-job 'practice' would give them enough confidence to face the final competency test. However, the literature warns that competency cannot only be seen to be an assessment of how well the job activity was performed by the learner. According to Billett (2009) competence may be linked to performance, but it should also be linked to the kinds of work being done and how individuals engaged in their work. The findings in this study showed that learning occurred predominantly through interactions with, and through the mediation of mentors and other experts, locating the outcomes of learning within observable performance of the learners. Seventy seven percent of the learners said that the assessment of how they performed on the job in the workplace was done visually, and that whilst they practiced they were guided and coached to ensure they worked according to workplace requirements. Coaching ensured that previous knowledge acquired was secured and strengthened through repetition (Billett 1994). Polanyi, in Gamble (2002) argues that tacit knowledge is not easily put into words, and lies within the person acting out the performance, best demonstrated by procedures and actions. Furthermore, competence as defined by Meghnagi (2004) is, '...an undivided complex of knowledge, abilities, ideas and ways of doing things that make it possible to carry out an

occupation' (p. 62).

All the respondents in the auto-electrical trade had the opportunity to practise the main six areas of knowledge in their trade that they had learned at college. Respondents in the auto-electrical trade also confirmed that they practised most of the activities covered by the trade test, albeit that there was some concern about not having enough time to practice the skills, for instance:

There is not enough work to practice on. We got our trade test coming up the end of the year and a large part of the trade test is concentrated on the alternators, we do not get enough exposure (R2a).

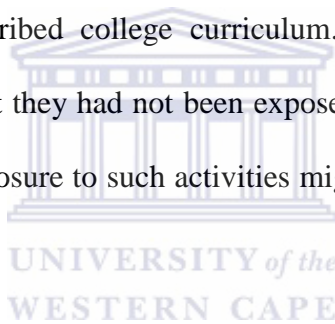
Respondents in the diesel mechanic trade reported more limited workplace exposure and opportunities to practice skills learned at the college, and that the extent of their practice depended on what was available in the workplace, as a respondent stated:

You do not get enough time to practice on the work activities because some activities do not come up a lot (R6a).

Another agreed as follows:

I don't have enough time to practice the skills because I don't get enough of the jobs that I will be doing at the trade test.... (R10a).

The limited time for practicing skills in the workplace was the result of production requirements which was somewhat of a double-edged sword. Since practice formed part of the job activity and was not performed separately from that, it also resulted in: 'because of the production schedule, you were required to work a lot faster, you got exposed to a lot more work' (R1a). In spite of constraints on practice time, production in the workplace provided candidates with the opportunity to get exposure to other skills such as time management, learning to work with others, being exposed to tight time schedules and learning to work under pressure. The disadvantage of such pressure though, from the perspective of the candidates, was that the skills practiced in the workplace were fewer than the skills taught in the prescribed college curriculum. Final year students exiting their apprenticeship training felt that they had not been exposed to sufficient skills practice in the workplace and that lack of exposure to such activities might compromise their success in the trade test.



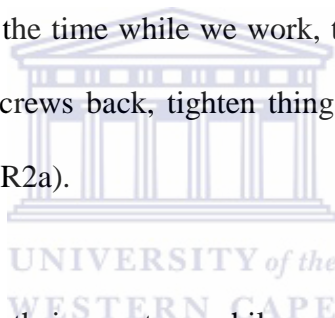
Competence is shaped by situational factors, emerging technologies, specific occupational requirements, and the capacities of those who enact those requirements, holds Billett (2009:34). Candidates' competence depended on how much time they had for certain categories of work in order to hone their skills and knowledge on the job, since time for 'off the job' practice and for trial and error was not catered for in the workplace:

The time to practice was limited to the time allocated for the job. There was no specific time set aside to practice. If there is free time then you might get an opportunity to practice' (R2a).

Candidates explained that they had targets which they had to meet, in the words of one, ‘we had to sell hours’. To some extent time was limited ‘to time on the job’, though a respondent explained that one needed to practice a skill by doing the same job over and over, to sharpen skills through repetition.

Competent performance at work was also linked to the subjective and personal dimension (Searle, 1995) as indicated by learners when they referred to the expectations of the workplace with regard to quality. A respondent mentioned that:

The artisan watches all the time while we work, they check your work afterwards to see if you put all the screws back, tighten things, otherwise he gets into trouble if something goes wrong (R2a).



Observation and coaching by their mentors while practicing their skills was a way of ensuring that correct procedures were followed, standards maintained, and that the job was done correctly.

Bereiter & Scardamalia, (1993) hold that theory and practical integration are ‘key’ to raising competency levels, which candidates in this study were required to demonstrate, and in terms of quality standards. Candidates were primarily assessed to ensure that the job was done correctly and to sustain the ‘well-being of the firm’ (Eraut, 2004), as the job was judged to be of quality if it met the requirements of the standards set by the mentor. Candidates often mentioned the high standards set for them by the expert: ‘the artisan that I work with, he is

very precise, you must be very precise, you must take pride in what you are doing...you don't take things for granted' (R4a).

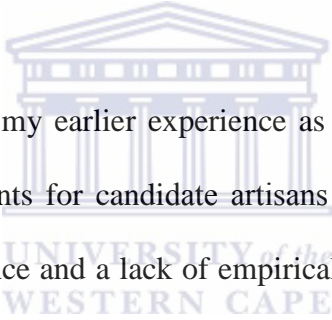
The next chapter offers some conclusions emanating from the data analysis and discussion, and sets forth tentative recommendations for addressing the challenges discerned in this research based.



CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1 LEARNINGS FROM THIS STUDY

In chapter one this thesis traced the evolving apprenticeship system in South Africa, highlighting some of the critique levelled at it, and alluding to the stigma of a ‘sit by Nellie’ approach that has characterised apprentices’ learning in the workplace historically. A major assumption of policy which I reiterate here is that although there may be imperfections, workplaces are critical sites of learning, since practical learning is necessary in order for candidates to achieve competence.



My own assumption based on my earlier experience as a vocational lecturer and qualified artisan was that work placements for candidate artisans often held little ‘real learning’. In addition, local anecdotal evidence and a lack of empirical evidence had resulted in a general view that learners’ experiences of the workplace are largely negative, with not much learning actually taking place. However, neither the policy, nor the personal and general anecdotal assumptions of workplace learning had put forward an account of the kind of learning that actually occurs in the workplace, the methodologies by which candidates learn, or the affordances in the workplace by which they do so.

It was therefore with a keen and genuine interest in what my research might turn up, that I embarked on this study. By virtue of the conclusions set out below, I could confirm the policy assumption that workplaces are indeed critical spaces for learning, but I could go further and actually state in some detail, on the basis of candidate experiences as they were

reported to me, the quality of learning that candidates are receiving. My own expectation that candidate apprentices were by and large receiving the same kind of desultory training that I had received long ago, I could, to my surprise, refute on the basis of the evidence gathered herein. The findings in this study show conclusively that learners in the workplace are enriched with an abundance of learning interventions and opportunities for learning that occur in a variety of ways, and are crucially linked to the role of an 'expert other' and modern, high tech artifacts as additional affordances.

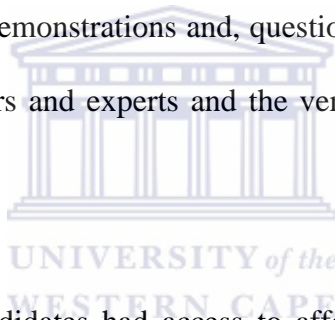
8.1.1 Learning Number One

Candidates experienced learning in the workplace through a range of methodologies, and artifacts, which catered to a variety of learning styles.

Candidates were involved in varied problem solving activities, finding solutions to the situations as they occurred. The situations in the workplace provided opportunities for learners to interact and engage with the mentor in a variety of ways such as talking, asking questions and also modelling their actions on what they had observed.

The candidates' in this study interacted with their mentors and other experts and valued their guidance, such interactions stemming mostly out of situations of observation, demonstrations, trial and error, and verbal guidance followed by questioning. Traditional apprenticeships have often been viewed as 'lacking an explicit theory of instruction and not dependent upon any formal teaching' (Coy, 1989; Scribner & Cole, 1971 in Guile & Young, 2002). However, this research has shed light on how learners experienced learning which was dynamic and ongoing. Candidates were privy to a workplace environment that supported

teaching and learning in a number of ways. The learning experience of candidates included goal directed activities instrumental in assisting individuals to learn new work related knowledge and strengthening that learning (Billett 1993, 1994a, 1994b, 1996, Harris & Volet 1997). Learning in the authentic environment of the workplace provided candidates with a perspective of the world of work that was unlike the classroom and the college workshop environment. Novices were exposed to a variety of learning opportunities in the workplace such as: observing others; trial and error; figuring things out for oneself; and practicing the skills learned in the workplace. This constituted the workplace pedagogy, a way of distributing knowledge and skills to learner. Despite the dominance of methodologies of learning such as observation, demonstrations and, question and answer, learners valued their engagements with their mentors and experts and the verbal guidance emanating from such engagements.



The findings indicate that candidates had access to affordances in the workplace such as computers and videos, texts, manuals, drawings, duplicate parts, donor vehicles and machines to support learning. Learning was significantly enhanced by candidates' access to a variety of high tech artifacts which assisted with fault finding procedures when attempting to solve problems, and these were valued for providing visual assistance on how to proceed. Fitting and turning, auto electrical, diesel and petrol trades made use of drawings and sketches as a means of communication. Graphically and symbolically, drawings provided an accurate blue-print of an object or product to be manufactured, or provided detailed descriptions showing the positions and locations of components in minute detail. The findings indicate that artifacts contributed significantly to candidates' mastery of their tasks

in the workplace.

Mentors in the workplace did not always directly use the artifacts as mediating tools to instruct candidates, but in most cases referred candidates to the artifacts to assist them to do the job correctly. In such cases learners benefitted from the indirect instruction in the workplace environment via artifacts, and here such artifacts as were used as mediating tools to bridge the mental-manual divide. The use of artifacts to strengthen the link between theory and practice proved to be critical to developing competence.

8.1.2 Learning Number Two

Candidates were able to link their practice in the workplace to their theoretical institutional learning, and to recognize the theory within the practice.

The findings of this research indicated a very high correlation between institutional learning and practice in the workplace, and there can be little doubt that practice in the workplace was underpinned by theoretical knowledge. Candidates confirmed that they were able to relate their work activities to the college theory they had learned and from their own accounts it could be noted that activities in the workplace were not done in isolation of the theory. Candidates had ample opportunity to develop an understanding of the ‘what’ and ‘why’ of their actions in the workplace. Responses indicated that doing things procedurally correctly was an important part of applying practical knowledge in the workplace, where actions had to be justified. The focus in the workplace was on the execution of the job, the doing of which they valued as a means of learning. Candidates dealt with problems through a process of elimination and applying efficient methods of working expressed in handbooks, rules or

company-specific codes of practice, since domain specific trades such as those in this study are known for their procedural knowledge in executing trade specific activities.

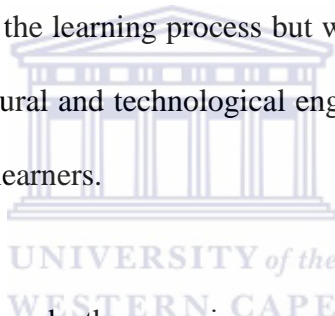
Candidates acknowledged that it was the systematic way of doing things at college, deemed to be the 'safe' way without posing unnecessary hazards that stood them in good stead. They found that the importance of following rules and procedures specific to the trade was a hallmark of practice in the workplace. Candidates were therefore able to find the links and could correlate their theoretical learning with practices on the workshop floor. Knowledge integration focused on domain-specific practices where knowledge of how things are done was dominant and was deemed to be important to ensure compliance with rules.

While much of the knowledge in the workplace is deemed to be tacit and practical such knowledge was made explicit through learners by connecting their principled or propositional knowledge with work activities, or with the 'knowledge of how things are done' (Cohen and Bacdayan, 1994: 554). While Bhyat showed in his study (2011) that the general and the particular could be connected when taught in a structured way, my study showed a wide array of methodologies for teaching and learning, which though often unstructured, resulted in learning. Mjelde's (1993) allusion to 'a pedagogy that surmounts the contradictions between intellectual and manual labour' were epitomised in this study. Judging from the kinds of tasks that candidates performed in the workplace which they perceived to indeed enhance their competence, it could be posited that 'theory and practical integration are key to raising competency levels' (Bereiter & Scardamalia, 1993); (Martinez and Badeaux, 1994).

8.1.3 Learning Number Three

Workplace settings offered a range of affordances to candidates, but the most important affordance was the presence of the expert under whose guidance the candidate became both confident and competent.

What emerged unequivocally from the research was the learning that was acquired through engagement of the candidates with the mentor or expert other, a notion located within Vygotsky's (1978) Zone of Proximal Development (ZPD) and juxtaposed with Lave and Wenger's (1991) concept of community of practice. My study showed that candidates were not left to their own devices in the learning process but were supported by a mentor or other expert who through social, cultural and technological engagement provided an abundance of direct and indirect guidance to learners.



Far from a 'sit by Nellie' approach, these novices engaged extensively with the mentor or expert. They were certainly not passive receivers of knowledge and skills but were socially engaged, and they experienced learning through their social situations and interactions. Candidates sought out and trusted the advice of the expert in the workplace which they experienced as direct guidance, and indirect guidance was given based on observations made and questions asked and answered. In spite of professing that they would learn best by doing, candidates discovered that the presence of the expert was needed to affirm their learning, and none of their assertions about learning by 'doing it myself', was unaccompanied by a reference to the oversight of the expert.

Seen through the lens of the activity system theoretical framework, the expert operated across domains, in that the expert's domain included direct guidance within the learner's ZPD, and indirect guidance within the community of practice to ensure that the rules governing the workplace practices were applied and implemented (see Fig 4).

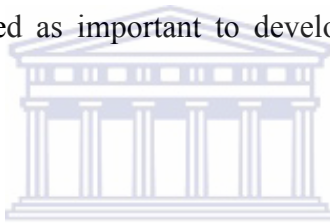
The expert had an overarching role in the collective activity system of the workplace with its many facets, role players and, its dynamic environment that included the rules that govern work practices. His/her mentoring role included modeling the work activities in order for the subject to see how things were done, and in this regard the expert had to mediate the methodologies of learning.

While learning in the workplace was dominated by methodologies such as observation, questioning, demonstration and practice, none of these methodologies could be performed in the absence of the expert. Under this watchful oversight, and with artifacts as additional affordances, candidates were able to make sense of theory, while direct guidance provided information and knowledge that candidates might not have had access to through observation only.

A challenge to the candidate-expert learning scenario was posed by the production pressure in the real work environment. The expert was tied to a production schedule, where time was a commodity – s/he had to 'sell hours' and meet production targets. Thus pressure on the expert potentially limits the quality of learning which the candidate is able to rely on, and ways may need to be found to free the expert from the production space from time to time, in

order to be able to mentor the candidate in work processes.

Candidates in this study aspired to qualify as competent artisans ready to take their place in the world of work, where competence was defined in chapter one herein to mean, ‘...an undivided complex of knowledge, abilities, ideas and ways of doing things that make it possible to carry out an occupation’ (Meghnagi, 2004, p. 62). In order for candidates to be found competent in the trade test they needed exposure to an abundance of learning opportunities that enhance their occupational competence. Maximum exposure to work activities was viewed as a way to enhance knowledge and skills acquisition and sufficient on-the-job ‘practice’ was perceived as important to develop the confidence to face the final competency test.



The findings in this study showed that learning occurred predominantly through interactions with, and the mediation of mentors and other experts, locating the outcomes of learning within the observable performances of the learners. Seventy seven percent of the learners said that the assessment of how they performed on the job in the workplace was done visually, and that whilst they practiced they were guided and coached to ensure they worked according to workplace requirements. Coaching ensured that previous knowledge acquired was secured and strengthened through repetition (Billett 1994).

In spite of limitations, learners experienced an abundance of learning opportunities in the workplace via the various methodologies and the vital, mostly unstructured interventions of the experts within their communities of practice.

8.2 CHALLENGES AND RECOMMENDATIONS

From the data, there were two major challenges that emerged: first, the limited time for mentoring by the expert given the pressures of production in the real work situation, and second, limitations on the scope of practice particularly in light of candidates' concerns about trade test readiness. These two challenges are elaborated on in the sections which follow, and a recommendation is offered in respect of each of them.

8.2.1 The challenge of time: production pressures

Candidates mentioned often the issue of limited time due to production pressures – both for practicing their skills in the workplace and to engage with the expert, since practice formed part of the job activity and was not performed separately of that. The findings showed that in most cases learning time was also ‘time on the job’, and candidates were primarily assessed to ensure that the job had been done correctly in order to sustain the ‘well-being of the firm’ (Eraut, 2004).

Candidates themselves credited the expert, acknowledging the many ways in which assistance and guidance had been given, and evidencing deep respect for the advice from the more experienced teacher. Direct and indirect guidance from the expert contributed so much to their learning, but the engagement between expert and learner left much to chance, as both parties were caught up with production targets. Candidates too were expected to conform to work outputs which were time based, using the term ‘selling hours’ to describe his work activity.

While the role of the expert in the development of the candidate was undisputed and predominant, there was little acknowledgement in context of its value as a critical component to skills development. The availability of the expert to the learner was constrained by production demands and workplaces were unable to suspend processes in order to create dedicated 'learning time'. Therefore the question becomes one of how to ensure that candidates spend as much time as possible in practice, in the presence of experts who are willing to impart their experience and expertise during the course of everyday activities.

8.2.2 Recommendation 1

In my view, this challenge is unlikely to be resolved by the employer alone, as business might not survive curtailing production to provide more intensive learning time. Collaboration will need to be fostered among the workplace, the training institution, the relevant industry authority, organised labour, and the appropriate policymakers. The purpose of such collaboration would be to recognize the role of the expert artisan in training up novices and preparing them for trade testing, and to look at ways in which to harness their expertise in a more structured arrangement which allows them the time to attend to the candidate in a less ad hoc manner. A stakeholder driven forum, where much is at stake, could seriously consider how to create periods of non-production for expert artisans where they could focus their work on the enhanced learning and preparation of the candidate. This would no doubt entail funding for the production hours lost by the expert or for a replacement worker to fill the gap created by the expert's teaching/mentoring time. Freeing up the expert artisan from a full production schedule would allow him/her to engage more purposefully with the candidate, taking into account issues that the candidate has difficulty with, assessing

what needs to be addressed for trade test purposes and so on. A closer relationship with the training provider where the candidate spends up to sixteen weeks before entering the workplace, would ensure that the each aspect of the training, in the workplace as well as in the institution, are covered adequately by both parties.

Given the centrality of the use of artifacts for mediating learning in the workplace as detailed in above, there could be much greater use made of such artifacts in the learning institution, and workplaces could assist training institutions with advice or procurement of these artifacts, particularly in the case of high tech artifacts which might be expensive to set up.

8.2.3 The challenge of scope of practice: adequate preparation for the trade test

A second challenge noted often in the data, was that of the scope of activities at particular workplaces. Candidates expressed their anxiety that they had not had a sufficiently broad and deep exposure to the range of tasks that they would be required to perform at the trade test. To reiterate, candidates recognised much of the topics that they had covered in theory classes, as underpinning the activities they carried out in the workplace, but they recognised too that their confidence which resulted from sufficient practice, was dependent on the kinds of jobs the particular workplace had to deal with at the time. At times candidates might repeat a number of the same tasks, but not have the opportunity to practise other skills if such jobs were not in the workshop at the time.

8.2.4 Recommendation 2

Currently colleges offer the Competency Based Modular Training (CBMT) modules but these modules are expensive private training packages and are not part of the officially prescribed national programmes. Discussions with college staff and employers revealed that the practical training in the CBMT modules is far more hands-on and materials based for the learner, and workplaces value the skills for work and production which are located within the CBMT modules. These practical modules appear to complement well the theory components that TVET colleges offer and they cover a wider range of skills in practice than candidates might obtain from one workplace. This arrangement is closer to that of the German ‘dual system’ of apprenticeship training. The CBMT in addition to theory would ensure that the future artisan exited the college with two knowledge types for work: formal knowledge (scientific and technological) embedded within the engineering qualification, as well as the hands on work skills located in the revised CBMT package.

With regard to exposing candidates to all the prescribed trade test topics, a system of host companies could be explored, where the candidate could rotate to other vendors who could provide the additional exposure that is lacking. The apprentice log book offers a window into the skills needed to be practiced and what modules are yet to be signed off on the job. Rotating candidates to placements where they are likely to obtain the full range of skills practice required, would also afford them wider exposure to different ways of doing and other communities of practice, a further enriching experience.

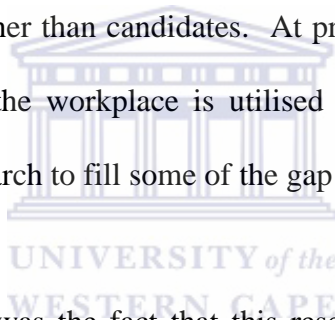
8.3 SIGNIFICANCE OF THIS RESEARCH

Skills development and TVET in particular have been the target of extensive policymaking in the last fifteen years, with much policy borrowing from other contexts. The local research base in the skills development domain has been shown to be thin, and there is much that is not known about how vocational/occupationally directed students learn in both the academy and the workplace apart from a popular notion that ‘learning by doing’ is beneficial to trainee artisans. While there has been a major policy drive to encourage employers to partner with TVET colleges and to open their workspaces for practical learning, there is little understanding of how the candidate learns in and from practice in the workplace. This research has attempted to fill this gap by focusing on the students, their experiences of workplace learning and their perspectives on how they might learn best. In spite of their assertions that they indeed learn best by ‘doing things themselves’, the data is interspersed with evidence that they needed constant reassurance from the expert practitioner, the mentor, the ‘expert other’ to affirm that they were doing the right thing and to push them to further understanding.

This window onto apprenticeship learning holds important implications for how learning in the workplace should be planned for, organized and supported, taking into account the production pressures upon qualified artisans and their limited availability to guide, model and engage with the novices, and in the light of just how powerful their leadership of the student could be. It is hoped that the tentative recommendations offered herein will find purchase in the spaces where skills development decisions are made.

8.4 IMPLICATIONS FOR FURTHER RESEARCH

At the outset of this research my interest was in how apprenticeship candidates are learning in the workplace, in light of policy imperatives that workplaces become learning spaces, and the anecdotal critique that for many learners they are not. I wanted to give voice to candidates about their own experiences of learning in light of my own experience as an apprentice many years earlier. The scope of this research was therefore deliberately limited to candidate perspectives rather than the accounts of employers and college representatives, except for the purpose of obtaining programme information. Further research might profitably probe these other views on how learning takes place in the workplace as experienced by role-players other than candidates. At present the body of local research on workplace learning and how the workplace is utilised as a learning environment is thin, hence the intention of this research to fill some of the gap in our understanding.



A second limitation of scope was the fact that this research was concerned only with the engineering trades, the rationale being that these trades account for large numbers of college student intakes annually, and the centrality of engineering skills training in South African skills development policy. Other training domains, for example the service industries might reveal different kinds of predominant learning methodologies and modalities. Though beyond the timeframes of this research, tracer studies of candidates' performance in the trade test, whenever that might occur, could shed light on the relationship between their institutional learning and their learning on the workshop floor if the candidates were afforded the opportunity to reflect further on the role of their workplace training in that ultimate test of their competence.

It is inevitable in a study of this nature, within a context where the terrain is still largely fresh and untrammelled, that questions will not be finally answered, and that much will remain to be interrogated from a variety of angles and with other lenses. That is a prospect to look forward to, in my view.

8.5 CONCLUDING REMARKS

In conclusion, I refer to the key learnings which have emerged from this study, given its focus at the outset: First, there can be little doubt that workplaces currently provide essential and complementary learning to that which takes place in TVET colleges, offering real work experiences and situating learning within communities of practice. Second, workplaces in this study offered an abundance of learning opportunities, using a range of methodologies and affordances, as well as direct and indirect instruction. Third, candidates in this study did not simply ‘sit by Nellie’ – they engaged dynamically with expert others, mentors and co-workers, learning from the periphery and at the centre, and demonstrating through their responses that their most valuable learning resource was the expert practitioner.

Despite the positive feedback around the huge learning potential of the workplace, this research also identifies challenges to be addressed in strengthening that context, such as harnessing and nurturing the role of the expert, increasing the use of (high tech) artifacts and enhancing the scope of practice opportunities for candidates in preparation for the Trade Test, the final test of their competence. Finally, it can be confirmed that candidates *are* learning in the workplace, far more than we might suppose, and that their occupational

competence is being advanced in no small measure. Our job as policymakers, institutional providers, employers and concerned individuals is to ensure that we retain and reward our expert practitioners in order to build a secure foundation for the next generation of artisans.



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APPENDIX A Permission to conduct research

Mr. Gerald Vollenhoven
49 Gemsbok Avenue
Lotus River
7941
February 2013

Research Unit
Dept. Higher Education and Training
Private Bag X 174
Pretoria
0001

Dear Sir/Madam

I am a registered PhD student at the University of the Western Cape. The title of my research is “Workplace learning experiences of TVET College candidates in learnership programmes: An exploration of the workplace learning environment”. I hereby request permission to conduct my research at a public TVET college. The research will entail collecting data via interviews with learnership candidates, college facilitators and learnership coordinators. Respondents will be asked for their consent to participate in the research and they will be assured of anonymity.

It is my intention to conduct my research during March, April and May 2013 should permission be granted.

I hope that this application will be considered favourably.

Yours in education

G. Vollenhoven.
Student No. 3079553

PARTICIPANTS COVERING LETTER

Workplace learning experiences of TVET College candidates in learnership programmes: An exploration of the workplace learning environment

Dear Student

I am currently conducting research into the above mentioned topic namely, 'Workplace learning experiences of TVET College candidates in learnership programmes: An exploration of the workplace learning environment'.

The aim of this research is to understand the workplace learning experiences of TVET college learnership candidates by investigating the learning opportunities afforded to learners in the workplace under the constraints of production.

This study is intended to contribute significantly to an understanding of the workplace learning environment and its role in enhancing learning in the workplace.

With the above mentioned in mind, I wish to invite you to participate in this study by allowing me to interview you. I wish to assure you that your input will be treated with the utmost confidentiality and that you will be given feedback of the results of this study.

Thank you for your co-operation and your time.

Yours in Education

.....

Gerald Vollenhoven (PhD Student-3079553)

APPENDIX C Consent forms for participants

CONSENT FORM FOR RESPONDENTS

Workplace learning experiences of TVET College candidates in learnership programmes: An exploration of the workplace learning environment

You are hereby invited to participate in this study on workplace learning

I.....(full name and surname- please print) hereby give consent for data to be collected from me by means of an interview for the purposes of this study. I have been informed that permission to conduct the research has been obtained from your employer.

I am aware that I may refuse to participate in the interview or have it audiotaped/video recorded.

The purpose of this study has been explained in the covering letter. My participation is voluntary and I may refrain from answering any or all of the questions with which I feel uncomfortable. I have the right to withdraw from the study at any time if I so wish.

Information gathered from this study will be treated with the utmost confidentiality and pseudonyms will be used to protect the respondent's identity.

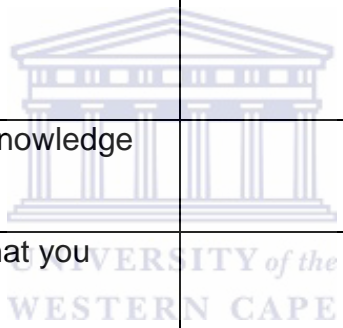
I am assured that the information will be used for research purposes only and that there is no risk in my participating in this study.

(Participant's signature)

(Place) (Date)

CRITICAL INCIDENT JOURNAL

Question	Response	Date Start	Date End
1. Identify a situation at work that you dealt with successfully during the last month spent at the company.			
2. Please describe the situation that arose as fully as possible?			
3. How did you go about dealing with this situation successfully?			
4. Why do you think you dealt with it successfully?			
5. Can you describe the knowledge that you had to apply?			
6. How was the problem that you faced solved?			
7. Was there anyone who assisted you to understand or solve the problem?			
8. What helped you to deal with the problem successfully?			
9. Was there anything that you think hindered you from dealing with the situation?			
10. When you think back over the situation that you have just described, what in your opinion could you have done better or differently?			



SEMI-STRUCTURED INTERVIEW SCHEDULE**A. How did learning occur in the workplace?**

1. Did you know what you would be doing or learning for the day, week or month? Did you follow a structured programme or did the workplace organize or schedule your activities for the day, week or month?
2. Did you know what was expected of you to do for the day? Were there activities that were prescribed by the mentor/supervisor?
3. Was there a specific task that you had to do?
4. What was it that the workplace expected from you?
5. Did the activities in the workplace support what you did in the college curriculum?
6. Did the activities involve your peers or others persons? How? Can you elaborate?
7. Did you learn any new skills and knowledge?
8. Can you explain how you acquired the new skills and knowledge?
9. Did anybody assist and help you? If so, in which way?
10. Did you acquire the skills and knowledge using any of the following: 1. Texts/manuals; videos; interactive computer?
11. Did you engage with any other persons or experts besides your mentor?
12. Can you describe how you learned from these persons or experts? Was it by; observing them, listening to them; talking to them; engaging in everyday activities with them.
13. Did the experts or mentor use any theoretical concepts to explain practical operations?
14. Did you work in group activities; did you have any specific responsibility within the group activity?
15. Were you involved in any problem-solving activities? Can you elaborate?

16. In terms of the problem solving activities, were you asked to figure things out by yourself or in groups?
17. Were you involved in problem-solving activities in the group?
18. Were these problem-solving activities planned beforehand?
19. Did you get any guidance from your mentor and other experts?
20. What form of communication was used in the activities? Did the mentor use language, drawings, demonstrations?
21. What specific event or occasion do you think really helped you to understand what you were doing in the workplace?
22. What in particular do you think helped you to master the task?
23. What did you think was the best way for you to learn at the workplace?

1. Were learnership candidates able to apply theory learned in the classroom in the workplace?

2. Were you able to apply the knowledge and skills that you acquired at the college to the workplace activities? How?
3. While you were working on the activities, were you asked by your mentor to explain why you did certain operations or tasks the way you did it?
4. What principles or procedures learned in college could you apply in the workplace? Can you please explain?
5. Were you asked to explain the principles and procedures that underpinned /supported your practice or the way that you were doing things? How?

6. What learning opportunities in the workplace enhanced candidates' occupational competence?

7. Were you granted opportunities to practice the skills that you have learned? When?
8. Were you given a specific time frame to practice the skill?
9. Did the workplace provide you with sufficient tools and equipment to practice with?
10. Was it required of you to work according to any standard criteria?

11. Did you practice in the company of your peers and other artisans?
12. Did their presence assist you in any way? Please explain
13. Were you assessed on the skill practiced? How was this done?





higher education
& training

Department
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

Private Bag X1174, PRETORIA, 0001, 123 Francis Baard Street, PRETORIA, 0002, South Africa
Tel: (012) 312 5911, Fax: (012) 321 6771
Private Bag X9152, CAPE TOWN, 8000, 103 Plein Street, CAPE TOWN, 8001, South Africa
Tel: (021) 469 6175, Fax: (021) 461 4761

Isiqingqi: Namá'izwa Mbedzeni

Isifaki: isiqingqi@det.gov.za

Telephone: 012 312 5911

Mr G Vollenhoven
49 Gembok Avenue
LOTUS RIVER
7941

By fax: 086 260 6261

Dear Mr Vollenhoven

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN A FET COLLEGE

I acknowledge receipt of your request for permission to conduct research in a **Further Education and Training (FET) College** in South Africa, as part of your studies towards a PhD degree at the University of the Western Cape, Faculty of Education. **CAPE**

The Department has evaluated your request and grants you permission to undertake the research. You are advised to obtain further permission from the Principal of the FET College concerned before commencing any research activities.

You are reminded to provide the approved research report to the Department as soon as it is available.

I wish you all the best in your studies.

Yours sincerely

Mr G F Qonde
Director-General

Date: 13/03/2013

APPENDIX G Targeted Respondents

Date of Interview	Code Name	Age	Race	Highest Grade Passed	Work Experience	Current Designation	Supervision
14-03-13	R1	22	W	12	3	App Printers Mechanic	Yes
22-03-13	R2	38	W	12	20	App Maintenance Fitter	Yes
25-03-13	R3	22	C	12	3	App Turner	Yes
25-03-13	R4	34	C	12	13	App Maintenance Fitter	Yes
26-03-13	R5	25	C	12	3	App Printers Mechanic	Yes
27-03-13	R6	26	B	12	3	App Printers Mechanic	Yes
27-03-13	R7	29	C	12	7	App Fitter	Yes
27-03-13	R8	38	C	12	20	App Maintenance Fitter	Yes

Date of Interview	Code Name	Age	Race	Highest Grade Passed	Work Experience	Current Designation	Supervision
26-03-13	R9	41	C	N2	24	App Millwright	Yes
26-03-13	R10	23	B	12	2	App Toolmaker	Yes
13-05-13	R1a	25	C	12	1.3	App Auto Electrician	Yes
13-05-13	R2a	30	W	12	1.3	App Auto Electrician	Yes
14-05-13	R3a	28	B	12	1.3	App Auto Electrician	Yes
14-05-13	R4a	28	C	12	1.3	App Auto Electrician	Yes
15-05-13	R5a	24	C	12	1..3	App Diesel Mechanic	Yes
15-05-13	R6a	31	B	12	1.3	App Diesel Mechanic	Yes
16-05-13	R7a	29	C	12	1.3	App Diesel Mechanic	Yes

Date of Interview	Code Name	Age	Race	Highest Grade Passed	Work Experience	Current Designation	Supervision
16-05-13	R8a	29	B	12	1.3	App Diesel Mechanic	Yes
17-05-13	R9a	28	B	12	1.3	App Diesel Mechanic	Yes
17-05-13	R10a	32	B	12	1.3	App Diesel Mechanic	Yes
20-06-13	R1b	22	C	12	4	App Motor Mechanic	No/Yes
20-06-13	R2b	24	C	12/N3	4.5	App Motor Mechanic	No/Yes
20-06-13	R3b	22	W	9/NCV L2	3.5	App Motor Mechanic	No/Yes
21-06-13	R4b	21	C	12	3.8	App Motor Mechanic	No/Yes
21-06-13	R5b	27	B	12	2	App Motor Mechanic	No/Yes
24-06-14	R6a	26	C	10/N3	5	App Motor Mechanic	No/Yes

Date of Interview	Code Name	Age	Race	Highest Grade Passed	Work Experience	Current Designation	Supervision
24-06-14	R7b	24	W	12	4	App Motor Mechanic	No/Yes
24-06-14	R8b	27	W	10/N2	3	App Motor Mechanic	No/Yes
25-06-14	R9b	24	C	12/N2	2	App Motor Mechanic	Yes
25-06-14	R10b	28	W	12/N3	0.3	App Motor Mechanic	Yes

LEGEND³:

B= Black

C= Coloured

W= White



³ The terms of racial classification used herein were created by the apartheid South African government. Their use in this thesis is merely for explanatory purposes, and in no way implies acceptance of such classification

LETTER OF REQUEST TO COLLEGE PRINCIPAL

Workplace learning experiences of TVET College candidates in learnership programmes: An exploration of the workplace learning environment

Dear Sir/Madam

I am currently conducting research into the above mentioned topic namely, 'Workplace learning experiences of FET College candidates in learnership programmes: An exploration of the workplace learning environment'.

The aim of this research is to understand the workplace learning experiences of TVET college learnership candidates by investigating the learning opportunities afforded to learners in the workplace under the constraints of production.

This study is intended to contribute significantly to an understanding of the workplace learning environment and its role in enhancing learning in the workplace.

With the above mentioned in mind, I wish to get your permission to interview learnership candidates in Level 3-4 Fitting and Turning and Motor Learnerships. I wish to assure you that you will be given access to the results of this study.

I trust that my request will be viewed favourably.

Yours in Education

.....

Gerald. Vollenhoven. (PhD Student NO. 3079553)

APPENDIX I Letter of request to training provider

LETTER OF REQUEST TO TRAINING PROVIDER

Workplace learning experiences of TVET College candidates in learnership programmes: An exploration of the workplace learning environment

Dear Sir/Madam

I am currently conducting research into the above mentioned topic namely, 'Workplace learning experiences of FET College candidates in learnership programmes: An exploration of the workplace learning environment'.

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I trust that my request will be viewed favourably.

Yours in Education

.....

Gerald. Vollenhoven. (PhD Student NO. 3079553)

APPENDIX J Letter of request to employer

LETTER OF REQUEST TO EMPLOYER

Workplace learning experiences of TVET College candidates in learnership programmes: An exploration of the workplace learning environment

Dear Sir/Madam

I am currently conducting research into the above mentioned topic namely, 'Workplace learning experiences of FET College candidates in learnership programmes: An exploration of the workplace learning environment'.

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With the above mentioned in mind, I wish to get your permission to interview learnership candidates in Level 3-4 Motor Learnerships. I wish to assure you that you will be given access to the results of this study.

I trust that my request will be viewed favourably.

Yours in Education

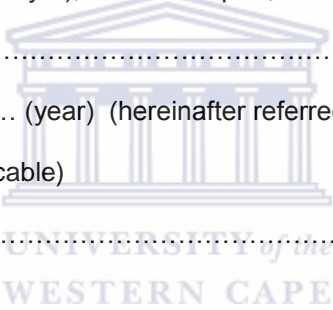
.....

Gerald. Vollenhoven. (PhD Student NO. 3079553)

APPENDIX K Apprenticeship contract Exemplar

**CONTRACT OF APPRENTICESHIP IN TERMS OF
THE MANPOWER TRAINING ACT, 1981**

This contract of apprenticeship commencing on the day of (month)
..... (year) (hereinafter referred to as the engagement date) made and entered into between
.....
.....of
(address).....
.....
(hereinafter referred to as the Employer), on the one part, and.....
identity document number born on the day of
..... (month) (year) (hereinafter referred to as the Apprentice), assisted
herein by his/her guardian (if applicable)
.....
.....of
(address).....
..... on the other part.



AGREEMENT

14. THAT the Apprentice, having been found physically able and having obtained the
..... certificate, does of his/her own free will (where legally required, with the consent
of his/her guardian) by those present agree:-
- a) to honour his/her contractual obligations to the Employer in the trade of
..... designated in terms of Section 13 (1)
and (2) of the Manpower Training Act, 1981 (hereinafter referred to as the Act), and the
relevant government notices in respect of the Motor Industry.
 - b) undertake to adhere to all the relevant legislation as may apply;
 - c) not to disclose or communicate to any person whomsoever any information relating to the
business other than in the ordinary course of his/her employment;

- d) not to solicit or take orders for or undertake any work within the scope of the Motor Industry whether for gain or not, other than for his/her Employer;
- e) to attend or undertake such technical classes, courses, examinations or test as may be determined by the conditions of apprenticeship of the MERSETA;
- f) to keep weekly record of all training received, including completion of modules in a log book and in accordance with conditions prescribed by the MERSETA and a true copy of which shall be handed to the Employer for record purposes.

2. THAT the Employer does by those present agree:-

- 15. to train the Apprentice in accordance with his/her contractual obligations;
- 16. to remunerate the Apprentice at no less than the relevant wage rate, supplemented by allowance prescribed for skills and academic achievements;
- 17. to pay such fees in respect of technical instructions as he/she may be required to pay in terms of any notice under Section 13 of the Act;
- 18. that the prescribed training programmes will commence within 90 (ninety) days of the engagement date;
- 19. to endorse and sign this contract on successful completion of the prescribed training programme and submit it to the regional office of the MERSETA for termination. The MERSETA shall forward the original to the Apprentice to be his/her property;

3. THAT it is further agreed between all parties to the contract that:-

- 20. after fair procedures had been followed and the Employer is satisfied that the Apprentice has committed a serious breach of terms of his/her contract or that the Apprentice conducted or is conducting himself/herself in an unseemly manner and contrary to good discipline and such conduct is not conducive to his/her training, the Employer's business or the attainment of the objects of the Act, whether during or outside his/her working hours or when attending classes or course or taking examinations in accordance with the conditions of apprenticeship during his/her stay in a hostel, if such stay related to his/her apprenticeship, the Employer may forthwith suspend the Apprentice for a period not exceeding the number of days which the Apprentice ordinarily works in a week and shall report the matter to the regional office in question of the MERSETA for confirmation and approval, within 3 (three) days of the date on which he/she suspends the Apprentice.
- 21. where, owing to a lack of work or an exigency in the Motor Industry, short time is being worked by the Employer he/she may with the written approval of the MERSETA, given after consultation with the regional office in question, employ the apprentice on short time for such periods and such conditions as may be stipulated by the MERSETA.

As witness whereof the contracting parties hereto have hereunder set their hands this

.....day ofmonthyear

AS WITNESS

1.)

2.)

EMPLOYER

1).....

.....
2.).....

GUARDIAN (If Apprentice is a minor)

1.).....

.....
2.).....

APPRENTICE

Registered at the office of the MERSETA on this

.....day of.....(month)(year)

ADMINISTRATION MANAGER

COMPLETION

This is to certify that the Apprentice

.....

.....

has completed all prescribed training and successfully completed all prescribed modules and

tests in

the trade of

.....

COMPLETION DATE:day of(month)

.....(year).....

Employer

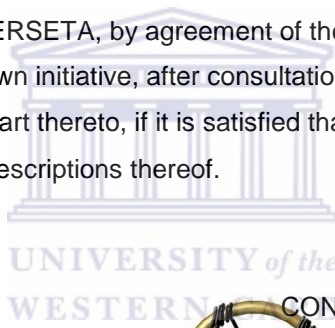
QUALIFICATION NOTED:day (month)(year)

.....

ADMINISTRATION MANAGER

NOTE:- No contract of apprenticeship shall be rescinded except:-

- 22. with the consent of the MERSETA, by agreement of the parties thereto; or
- 23. by the MERSETA on its own initiative, after consultation with the regional office in question, or at the instance of any part thereto, if it is satisfied that it is expedient to do so in terms of this agreement and the prescriptions thereof.



CONTRACT NO.....



merSETA

MANUFACTURING, ENGINEERING AND RELATED SERVICES SETA

ADDENDUM TO CONTRACT OF APPRENTICESHIP IN TERMS OF THE MANPOWER TRAINING ACT, 1981

COMPETENCY BASED MODULAR TRAINING SYSTEM (CBMT)

This addendum attached to the contract of apprenticeship made and entered into between.....

.....(of address)

.....

..... (hereinafter referred to as the Employer), on the one part, and

.....identity document

number

.....(address).....

..... (herein after referred to as the Apprentice), on the other part.

The Apprentice acknowledges receipt of the training material and will commence with training in terms of the CBMT system on day of(month) (year).

The Apprentice and the Employer by their signatories hereto acknowledge and confirm that they are familiar with and understand the relevant legislations pertaining to the contract of apprenticeship to which this addendum applies and acknowledge that the terms and conditions contained in this addendum are incorporated in the contract of apprenticeship.

As witness whereof the contracting parties hereto have hereunder set their hands this day of (month) (year)

AS WITNESSES

- 1.
- 2.



EMPLOYER

- 1.
- 2.

GUARDIAN (If apprentice is a minor)

- 1.
- 2.

.....

APPRENTICE

.....

ADMINISTRATION MANAGER



ARTISAN RPL (PREVIOUSLY SECTION 28) TRADE TEST APPLICATION

REQUIREMENTS TO QUALIFY FOR ARTISAN RPL (RECOGNITION OF PRIOR LEARNING) (PREVIOUSLY SECTION 28) TRADE TEST

QUALIFYING CRITERIA CATEGORIES:	
24.	Minimum three (3) years relevant work experience within South Africa and N2 four subjects certificate or equivalent qualification including relevant trade theory. OR
25.	Minimum three (3) years relevant work experience within South Africa and Relevant Engineering NC(V) NQF level 3 . OR
26.	Minimum three (3) years relevant work experience within South Africa and Technical Grade 12 with Maths, Engineering Science and related theory subject . OR
27.	Minimum Eighteen (18) months relevant work experience within South Africa, completed of all relevant work experience modules and Relevant Engineering NC(V) NQF level 4 . OR
28.	Minimum Eighteen (18) months relevant work experience within South Africa and relevant (directly related to the trade theory subjects) N6 certificate or National Technical Diploma (S and N Stream)
29.	Minimum four (4) years work experience within South Africa with Grade 9 (Standard 7)
30.	Successful completion of merSETA registered NQF Level 2, 3 and 4 trade related learnerships with minimum two (2) years, inclusive of the institutional and workplace components OR
31.	Former apprentice who have met the section 13 trade test requirements and their contract got rescinded before qualifying as artisan.
32.	Former apprentices under Section 13 terminated before they could qualify for trade test, and either have proven eligibility for Artisan RPL (Recognition of Prior Learning) trade test based on acquired skills from the formal training part under Section 13, or have undergone additional approved training to meet the requirement.
DOCUMENTS REQUIRED WITH THIS APPLICATION (CERTIFIED BY THE COMMISSIONER OF OATH):	
33.	Clear originally certified copy of Identity Document
34.	Originally certified copy of highest school qualification
35.	Original or originally certified service letter on a company letter head as proof of experience within South Africa with detailed daily duties, start date and signed off by the duly authorised person. OR An affidavit (SAPS) may be accepted with the details (addresses, telephone number and references in case the company has closed down or company refusing to issue the letter or applicant being operating in informal businesses). The applicant must undergo pre-test assessment. The evaluation will be investigated and verified by the Quality Assuror.
36.	Where applicable, originally certified copy of a valid work permit
NOTE:	

37.	A candidate, who attempted a trade test and passed at least 50% of the number of tasks given, will be given credits for those tasks. The credits accumulated will be retained by the candidate for a maximum of 3 attempts or 18 months from the date of successful completion of the trade task whichever comes first.
38.	A period of at least one-month must lapse before a 2 nd attempt at a trade test may be undertaken.
39.	The merSETA will communicate the outcome of the application directly with the applicant and not third party
40.	Applicant must not be registered on an apprenticeship or learnership.
41.	An arrangement may be made for merSETA to pay for the trade test fee for unemployed candidates.
42.	A pre-assessment may be recommended whereby the cost will be born by the employer or candidate
43.	Relevant work experience means according to training schedules for the trade.

Application Form to Qualify For Trade Test

Section: A

Surname									
Full Names									
Identity Number					Highest Qualification				
Gender		Male		Female		Marital Status			
Disability or special needs required									
Race									
African		Indian		Coloured		White		Other	
Residential Address					Postal Address				
Telephone (Home)					Telephone (Work)				
Fax number					Cell Phone Number				
Trade applied for									

Section: B

Currently Employed		Unemployed		NB. If unemployed, please attached an affidavit confirming unemployed status						
Skills Development Levy No:		L								
Name of Employer										
Address of the Employer										
Present Occupation										
Apprenticeship Served (If any):										
Contract No.					From				To	
Name and Address of Employer										

Training and Experience (Give full details and exact dates)

Name and Address of Employer	From	To	Occupation

Previous Trade Test / Assessment Undergone and Results (Attach copies)

Year	Result

LIST THREE TRADE TEST CENTRES IN ORDER OF CHOICE (Contact Regional office)

44.	45.
46.	

NOTE 1: Tool Jig, Die-maker and Plastic Mould Makers, the applicant needs to do pre-work before attempting the actual trade test. Documentation in this regard must be requested from the applicable Regional Office of merSETA prior to the trade test date for completion.

NOTE 2: The merSETA may decline the application if there is a conflict of interest with regard to the selected DTTC.

I

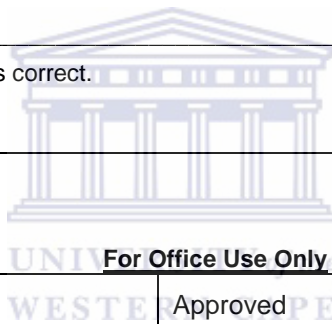
Identity _____

Declare that the information provided is correct.

Applicants Signature: _____

Date: _____

Section: C



ETQA Quality Assuror	Approved			
Remarks SMS updated	Not Approved			
	Date:			
	Signature:			

ARTISAN RPL TRADE TEST SELF EVALUATION CHECKLIST (To be completed by applicant)

Name of applicant:	ID Number:
47. Application completed in full	
48. Clear original certified ID copy attached	
49. Candidate not currently registered apprentice / learner	
50. Original certified copy of qualification (including relevant trade theory) in respect of candidates with a minimum of number of years experience; or	
51. Pre-assessment evaluation by the provider	
	Not recommended Recommended
52. Original certified copy of High School results / original affidavit	
53. Original or originally certified reference letter(s) on a company letterhead indicating years of work experience relevant to the trade including starting and end dates of employment	
54. Attach affidavit confirming unemployed status if unemployed	
55. Detailed breakdown of tasks evaluated against the training schedules	

	Not acceptable	Acceptable
	Remark:	
56.	Previous results attached, if applicable	

All of the above criteria must be met before any contract is accepted by any merSETA official.

I hereby confirm that all the details required for registration as stipulated above are attached and complied with and the information required correspond with details as reflected on the application form.

Name of Applicant : _____

Signature of Applicant : _____

Date : _____



