What Personal Histories of Workplace Learning Reveal about Assessment Practices in Vocational Education and Training

Nondumiso Innocentia Mnisi

A Thesis Submitted in Partial Fulfilment of the Degree of Masters of Education in the Faculty of Humanities,
University of the Witwatersrand.

April 2011

Declaration

I declare that this Thesis is my own unaided work.

Nondumiso Innocentia Mnisi

Place_____ **Date**_____

Acknowledgements

My thanks are expressed to the following people who made the completion of this Masters Research Report possible. Our Heavenly father: May all we do begin with your inspiration, continue with your help and reach perfection under your guidance. This work is dedicated to my daughter Lethokuhle Denise Masuku. My largest debt gratitude goes to my family who encouraged, and supported me through my studies.

I would like to express my sincere gratitude and appreciation to my supervisor Professor Ian Moll for his continuous encouragement, support, patience and guidance.

The South African Qualification Framework, for recognising my potential and be able to fund my studies, I also dedicate this research to the late Ben Parker who was a Director for SAQA in the Directorate research division, without his idea, development, as well as passion in research , this research was not going to be possible.

The furniture factory Manager and workers for their co-operation when I was conducting interviews. The Withmore scholarship for financing my studies in 2010.

Mr Odwora Patric Jaki for his last minute time for editing giving valuable ideas and guidance. My friends Bianca Brief and Thobile Mtsweni for giving ideas and assistance anytime I needed help. Mrs Shalati Mabunda for encouraging and motivating me always.

Last dedication goes to my late grandmother Mantombi Miriam Mnisi who always encouraged and guided me in all walks of life.

Abstract

This research report is concerned with the acquiring and assessment of tacit knowledge in the workplace, that is, craft or vocational knowledge. It is part of a broader research initiative on the part of SAQA, which is aimed at informing the NQF and how it should represent the outcomes of vocational education and training. This broad project is based on ethnographies of a number of workplaces — this one was carried out in a furniture factories. It focuses on data drawn from the personal histories of ten workers, who are at various points on the mourned form novice to expert furniture maker. The personal histories approach, which relies on in-depth interviews, adds a component to the full ethnography of this workplace, which is ongoing. The study proposes certain stages in the pathway from being a novice to becoming an expert, which are encountering, experiencing, mediation, internalization and consolidation of the knowledge of a craft trade. The data from each interview reveals that when workers participate in a craft, they perform minor activities such as observation, imitating, collaboration and helping with cutting. Through these practice and daily experiences, which mostly involves trials and errors they learn and rectify their mistakes using guidance and instruction that they receive from the master craft person as well as their skilled peers. In this way their learning shifts from merely being an observer to becoming an expert as they develop and become more skilled. More skills enabled them to make judgements or to assess their own work and the work of others

Key words

Communities of practice: These are networks within an organization, where people with common interest and problem can meet. Through their common language and work habits they develop over time more trust and openness to transfer and share knowledge openly (Disterer, 2001:5).

Tacit Knowledge: 'Highly personal'. It is hard to formalize and, therefore, difficult to communicate to others…. Tacit knowledge is also deeply rooted in action and in an individual's commitment to a specific context for example a crafts or profession, (Nonaka in Solomon, 2005:14).

Explicit Knowledge: Easily communicated to others and can be stored, shared, verified, and reused, can be transferred to others by means of information technology system.

Workplace Learning: Takes place in context which are practical in the sense that they are directed towards some other primary end than learning, namely the production of some goods or services.

Assessment: To assess is to measure something against a given criteria or performance.

Workplace Assessment: The collection of evidence on the performance of an individual against agreed objectives and criteria, carried out within workplace premises.

Ethnography: A particular method of data collection, but is a style of research that is distinguished by its objectives. These are to understand the social meanings, and activities of people in a particular cultural setting, and its approach, which involves close association with, and often participation in this setting

Novice: A learner who is being trained by an expert person to master a particular skill, usually the apprentice learns by being formally taught, from observation and by participating in learning activities.

Expert: Someone who has mastered a particular skill in a workplace for example a master crafts person skilled at the making of furniture.

Artefacts: These are all the materials or tools that are use in the workplace, normally these artefacts defines the nature of the workplace, this tools are crucial for the success, and functioning of the workplace, for example in a factory furniture they use different machines such a drillers, cross cutters etc without these machine the production process might delay.

List of Tables

Table Of Contents

Chapter 1

Introduction

1.0. Introduction:

This study investigates workplace knowledge and its development in the context of the National Qualification Framework (NQF). "The aim of this framework is to unify qualifications in education and training based on set standards and set assessment procedures that are nationally applicable," (HSRC, 1995: 7). This framework comprises many unit standards, against which assessment judgments take place regarding different skills and qualifications in the South African education and training system. The unit standard is a statement of the outcomes (knowledge, skills, and abilities) that are to be demonstrated by an individual in order to obtain credit for the unit (HSRC, 1995: 16).

The NQF falls under the supervision of South African Qualification Authority (SAQA), which was established to oversee the development and implementation of the National Qualifications Framework (NQF). Isaacs (2008:32) explains that "the present research project is part of a broader SAQA initiative aimed at understanding workplace learning and assessment processes".

SAQA has come to believe that expert assessment in the workplace involves some aspect of tacit skills and knowledge. Through this awareness SAQA developed a research programme which involves collecting and evaluating evidence from different workplace situations. For this to be realized, the SAQA Research Directorate embarked in 2008 on a broad range of ethnographic studies of workplace learning, with the aim of understanding how assessment of the tacit learning of vocational knowledge and skill actually takes place. The current study is one component of that overall initiative. Here, the researcher explores a particular data gathering technique, namely the gathering of the personal histories of workers, as a means of analysing their learning and its assessment in the workplace. The methodology has given insight into what goes on during the assessment process, and how tacit skills are used.

1.1. Focus

An initial working definition of tacit knowledge will assist the reader at this stage. Tacit knowledge can be defined as a type of knowledge that is acquired subconsciously; this makes it rather difficult for an individual to articulate. Whereas tacit knowledge cannot be put into writing, even through its aim is to help individuals in improving what they do, (Moll et al, 2005,). Explicit knowledge can be put into written form, in books, manuals and formal instructions. The following example will clarify the differences between tacit and explicit knowledge and how they are both acquired — for example, learning to cook or bake. An individual will not become an expert in cooking (master of cooking or baking) in one day. This requires a lot of practice in learning how to use cooking equipments, mixing ingredients and so forth. A person cannot learn to cook or to bake merely by reading cooking instructions, lists of ingredients but rather through doing the actual cooking or baking. In this way one is more likely to master the skill.

When an individual practices more often, it then becomes second nature in a sense that from tasting a cake baked by a learner-chef he/she can easily tell when some ingredients are missing. Notice that already from this example an expert judgment will take place. A further example is learning how to drive (Moll et al, 2005:91). When an individual is a learner driver, he/she has to consciously think about a set of rules and procedures to be applied before driving. Some of those rules are explicit, for example, pushing in the clutch as one brakes so that the car's engine does not stall. It is hard to concentrate and initially most of the time it goes wrong. However, as a person practices more, he/she uses tacit knowledge. There is no need to follow procedures while driving since he/she unconsciously knows what to do. This is regarded as tacit knowledge.

This study focuses on the transfer of tacit knowledge in the workplace, and the judgements made by a skilled person (expert) when assessing a less skilled person (apprentice). One area of learning that is often ignored is the acquisition and assessment of tacit knowledge in workplaces. It is obvious that, in order to describe such assessment, we must be able to identify and understand the various moments through which a novice comes to be an expert in the workplace. So this study examines the possibilities available and the processes involved when assessing such knowledge.

1.2. Aims

The goal of educational research is to extend the researcher's understanding and knowledge so that this may be used to benefit and improve education (Donald, Lazarus & Lowland, 1997:98). In this specific context, the aim of this research serves three purposes. First, the research attempts to explore the objectives of the National Qualifications Framework (NQF) in relation to the unit standards containing explicit formulation of knowledge, skills and qualification criteria, the function of vocational education and training Second, it seeks to discuss the main function of SAQA in relation to workplace learning; and third, it explores ways in which we need to re-think assessment in the NQF in order to recognize the tacit knowledge which is gained by learners in vocational education and training, different workplaces and the tacit judgments that are made by experts when assessing the work of novices. Lastly, to understand the constitution and development of assessment expertise in vocational context.

1.3. Rationale

The objectives of the NQF "is to promote access to education, provide redress, encourage portability and progression, en sure quality and enable people to become lifelong learners" (Isaacs, 2008: 34). The NQF is a national system which provides benchmarks against which people's learning will be recognized. It sets up ways in which standards for education and training are to be developed and registered, and ways in which qualifications can be put together (Moll et al, 2005:141). The standards measured in the NQF are descriptive of learning to be achieved for the attainment of any qualification.

One purported aim of the NQF is to provide a clear national standard which recognize learning achievement outside formal institutions. On a structural level, the NQF aims to free our systems of qualifications, and therefore the learning and career pathways open to learners. The NQF is, then, effectively a structure in which qualifications are grouped together, based on principles that aim at a more flexible and accessible system of certification (Moll et al, 2005). In doing this research it might assist with re-structuring the NQF in a way that informal skill and education, which is found mainly in vocational training centres or workplaces receives same recognition as the formal education.

Moll et al (2005), suggest that the recognition of the achievement of unit standards and qualifications does not depend on where they were learned. The locations of learning are

different and include school, college, workplace training and other forms of education. The NQF groups learning into twelve organizing fields, they provide value to both knowledge and skills, it then gives appropriate standards setting and qualification design process. However, there are many ways of describing and grouping knowledge and learning, thus these fields are simply a way of helping to provide a system for the development of standards and qualifications. The NQF was developed by the SAQA Act (Act 58 of 1995). SAQA's roles are to make sure that the NQF is developed and implemented. As an organization, it represents key stakeholders in education and training. It is an overseeing rather than an implementation organization, but has powers to set up various structures that can carry out functions linked to the NQF. The workplace has changed fundamentally and dramatically in recent years. Companies are investing into research and development. As a result SAQA sees itself as admirably placed to promote this sharing of information with the world of education and labour (Samuels, 2008:35). This emphasizes that the focus should not be directed only towards explicit knowledge, but also towards tacit knowledge as it plays a crucial role in terms of the economic development of this country. It has been acknowledged that it is not only formal, explicit or theoretical knowledge that assessors employ when assessing apprentice or learners, but also tacit knowledge. Furthermore, it has also been acknowledged that the NQF has to be revised in order to recognise the worth of tacit knowledge and assessment in vocational education and training.

1.4. Problem Statement

The NQF has been the subject of serious argument and debate in recent years in vocational educational and training. Theorists such as Allias (2007) have argued about the rise and fall of the NQF in South Africa due to the lack of specification in terms of learner skills and knowledge found in the set unit standards. Despite such criticisms, it has become increasingly evident that expert assessment, at least in the workplace is a matter of the tacit judgment of tacit knowledge by recognized members of expert communities of vocational practice.

This recognition requires radical rethinking for the purpose of the implementation of the NQF. A current SAQA research programme seeks to collect evidence from various vocational workplaces in order to understand the constitution and development of assessment expertise in communities of practice within the vocational contexts, and this might possibly address the central argument which reveals a serious division between theory and practical knowledge. The theory gets as well as students who do well at more theoretical studies get

recognition at workplaces. By contrast, students who do well in practical studies get less recognition. This type of assessment becomes invalid. Killen (2003) argues that educators should draw valid interpretation from their assessment practices. Moll et al, (2005) maintain that this is not a good attitude for a democratic country where all skills should be valued, particularly for an economy that requires a wide range of technical and practical abilities. This then gives rise to the necessity to rethink the objectives of the NQF in terms of the way it measures the unit standards so as to give equal recognition to tacit knowledge.

In addition, Parker (2008:35) argues that the NQF and its structures cannot be set in stone, but must evolve with changing circumstance. We have to understand the different forms of *knowing* and *learning* which are embedded in different frameworks and the differences in curriculum assessment in the education and occupational arenas, thus the proposed legislation place an even greater emphasis on the need for a more scientifically-based and research-driven approach. This argument implies that the NQF should link education and training by setting up its unit standards and assessment to recognize explicit and tacit knowledge. Tacit knowledge should gain the same value as explicit knowledge in terms of assessment for skills and qualification in the NQF. This recognition requires radical rethinking on the purpose of implementation the NQF, and a current SAQA research programme seeks to collect evidence from various workplaces.

1.5 Research Questions.

Ethnographic research is by its very nature broad, open-ended and exploratory. In this study, the researcher restricted herself to two broad questions:

1) How is tacit knowledge transferred in the workplace?

2) How do the experts judge (assess) the work of the apprentice in this regard?

Structured interview questions were also developed at the outset, to guide the interviews with key participants that constituted the core of this study:

Structured Interview Questions:

1. How long have you been in this job; and how long did it take you to master it?
2. Did you have previous experiences in relation to the job?
3. Describe your first day at work? How did you cope?
4. Have you ever been asked to assist a novice?
5. What was your experience when assisting a novice?
6. What do you think is the most difficult thing for novices to grasp?

7. Who assesses when a novice is competent enough to enter the field?
8. How did you learn to do that? Did anyone help you?
9. How could you help a novice to learn to do that?
10. Tell me about a situation regarding using machines or anything in the factory that you did not handle too well.
11. How could you help a novice worker on how to handle such situations?

1.6 Chapter Summaries

Chapter 1: The introduction sets out the aims and objectives of this study. It outlines what the National Qualification Framework comprises of, its objectives, as well as the establishment of South African Qualification Framework SAQA, the need to integrate education and training, which then leads to the need to recognise tacit knowledge, transfer of tacit knowledge from experts to novice and the judgement that are made by experts when assessing novices' work. It concludes by setting out the research questions for the study.

Chapter 2: The review of literature briefly discusses the nature of knowledge, and reveals an in depth distinction between two types of knowledge namely, tacit and explicit knowledge with illustrations from different context. It is then followed by a theory of knowledge, assessment, as well as a discussion on what entails expertise knowledge.

Chapter 3: This is the methodology section, which discusses the method that has been selected for the study. It also gives justification for selecting the research methods that have been employed here.

Chapter 4: Ethnographic data is 'thick description', interesting in its own right as a narratives of the issues that the Research Report is concerned with. This section deals with how data was organized and presents aspects of the ethnographic data empirically (i.e. in their raw form).

Chapter 5: This is the data analysis section, where the relevant theories are used as a frame work of analysing the data collected. It includes a summary found in figure 1 stages of learning of analysis which displays the common patterns of the workers' learning experience in the furniture factory.

Chapter 6: It is the discussions and conclusion of the study which summarises the main finding and recommends for further research practices in the area of this research.

Lastly, are the attached appendices for ethical presentation (*see appendices*).

Chapter 2

Literature Review

2.0. Introduction

In this chapter I clarify the difference between *tacit* and *explicit* knowledge and the significance of each in the process of knowing and learning. The focus will emphasize the recognition of tacit knowledge in the National Qualifications Framework (NQF) which hitherto has tended to focus mostly on explicit knowledge when measuring the unit standards or qualifications. Central to this literature review is the theory of *community of practice* which is important in detailing and explaining how novices are assessed in the communities of practice which mostly concentrated on tacit engagements and practices.

2.1. The Nature of Knowledge

Knowledge is not just an intellectual search for absolute truth, but is also discovered in practical activities, where its usefulness is derived in guiding subsequent activities (Glasser, 2007). Obtaining meaning in practice becomes central in relation to how people acquire knowledge. In this regard, participation becomes an important tool in learning and in acquiring that knowledge. Murphy and Hall (2008: 07) point out that participating is more than just a social affair; in contrast, knowledge guides action, and action guides knowledge. Knowledge is integrated with activities, along with tools, sign systems and skills associated with the activity". This means that knowledge and actions have a reciprocal relationship (McCormick and Paechter, 1999: 104). In illustrating the interrelationship between knowledge and activity; for example, in woodwork, for a master craftsman to cut a piece of wood he needs to apply his knowledge of measurement to measure and mark the correct size before cutting. He also needs to know how to use a particular machine such as a cross cutter as well as a tape measure to mark the correct size or angle in a piece of wood.

2.2. Tacit and Explicit Knowledge

According to Cole (cited in Solomon, 2005: 11),

> Knowledge can be tacit rather than explicit (fully 'articulated') and as a result it tends to be either less or more teachable. This suggests that it may or may

> not be practically observed, it may be complex or simple, and it may be an element in a system or an independent factor. Knowledge that is visible tends to be explicit, teachable, observable in use, simple, and independent. On the other hand intangible knowledge tends to tacit, less teachable, and less observable in use, more complex, and an element of a system.

But what is tacit and explicit?

2.2.1. Tacit Knowledge:

The 'father figure' of tacit knowledge theory is Polanyi (1966). He defines tacit knowledge as highly personal and hard to formalize, making it difficult to communicate or share with others. Subjective insights, intuitions and hunches fall into this category of knowledge. It is deeply rooted in and individuals' actions and experience as well as in the ideals, values, or emotions he/she embraces. Tacit knowledge entails personal quality which makes it hard to formalize and communicate. It 'indwells' in the awareness of the human mind and body. Polanyi (1966) further explains that when we understand something tacitly, we "incorporate it into our body." This means that just as a person cannot understand poetry simply by reading about poetic structure, a person cannot employ tacit knowledge to understand reality (Hurst, 2010:08).

Hurst (2010: 03), drawing on Polanyi, characterizes tacit knowledge as the kind of knowledge used by people who act and make judgments all the time, but who often have no explicit theory of their work. This could be referred to as 'know how' (practice) as opposed to know what (facts) or know why (science). Another way is to make a distinction between embodied knowledge and theoretical knowledge. On this account knowing *how* or embodied knowledge characteristic of the expert who acts, make judgment and so forth without explicitly reflecting on the principles, rules, procedures involved.

According to Polanyi (1966; see also Hurst, 2010: 3), individuals cannot completely articulate tacit knowledge because it is based on bodily and communal realities and not in concepts. He maintains that tacit knowledge functions as background knowledge that assists in accomplishing tasks, and varies from one situation to another. It seems that tacit knowledge is difficult to document, communicate, describe, replicate, or imitate because it is a result of human experience; human experiences are unique and personal. Such skills cannot be learned from a textbook or even a class but only through years of mentoring and experience, does one develop it. Solomon (2005:13) also explains that "tacit knowledge is

intangible and highly personal, consisting of information that is difficult to communicate, formalise, and share. Tacit knowledge consists of individual experience, personal skills, subjective insight, hunches, and intuitions, and is acquired through watching and doing."

The skills of a master or top manager cannot be learned from a textbook or even in class, but only through years of experience and apprenticeship. It therefore explains and enables people to have a 'gut feeling' or a 'six sense' that something is wrong or missing. It concerns knowing *how* to ride a bicycle, *how* to recognise the smell of coffee and it is thus not the type of knowledge found in books — explicit knowledge. Rather, it is the knowledge that develops through experience. In addition to this (Nonaka, Konno and Haldin-Herrgard, cited in Solomon, 2005:13) maintains that "tacit knowledge is deeply rooted in actions, ideals, values, beliefs, practices and experiences that are stored in human beings. In this way tacit knowledge is internalised."

Tacit knowledge can be understood as a type of knowledge that is imbedded in a person's mind and body. According to Wenger (1998:47), this essentially implies that "the tacit is what we take for granted and so tends to fade into the background of our minds, it is not forgotten though, it tends to relegate to the individual subconscious, to what we all know instinctively, to what comes natural". It then becomes difficult for an individual to express him/herself in writing. This type of knowledge that is essentially personal in nature is difficult to extract from the head of individuals.

Furthermore, it is the knowledge that people may not know they have or may find difficult to articulate (Horvath, 1999 cited in Hurst 2010:05). This knowledge must often be inferred from actions and statements, in other words tacit knowledge is *knowledge* acquired through personal experience rather than received from others through instruction. People find this type of knowledge difficult to explain to others.

In this regard, tacit knowledge can be defined as subconsciously understood or applied, difficult to articulate, and it develops from direct action and experience. This type of knowledge is acquired through practice thus it becomes second nature. Polanyi (1966) argues that it is personal, context-specific and difficult to articulate. It may be compared to skill acquisition. It may be possible to read the 'how-to-do' manual but such manuals do not embody the full reality of the experience in context for instance; swimming in a pool is very

different from swimming in the sea. According to Pan and Scarbrough (1999:362), "Tacit knowledge is not available as a text; it involves intangible factors embedded in personal beliefs, experiences, and values." Nonaka and Takeuchi (1995) refer to tacit knowledge as knowledge that comprises experience and work knowledge that resides only within the individual. Nonaka and Takeuchi (1995) further describe tacit as a non-linguistic, non-numerical form of knowledge that is highly personal and context specific as well as being deeply rooted in individual experience, ideas, values and emotions.

Furthermore, Platts and Yeung (2000) consider tacit knowledge as "knowledge-inaction" which presumes that this is knowledge that has not been articulated as opposed to explicit knowledge that is readily accessible within the organizational domain. Blumentitt et al (1999) contend that information can be captured and stored in digital form whereas tacit knowledge repositories reside only an intelligent system that is within individuals. I will now discuss more examples of this type of knowledge to clarify what constitutes tacit knowledge. First, is the case of language itself. In nearly all cases, a native speaker of a language does not require rules of grammar to learn the language. He or she picks it up entirely unaware of the formal grammar. Again, learning how to ride a bicycle is something one learns through personal experimentation, which will include falling, struggling to pedal, and so forth. Furthermore, when learning to cook chefs do not follow a recipe always unless she or he is learning to cook a completely new meal, in which case he or she is likely to follow it once. Later on he or she will not read the recipe because it has been memorized (they can even smell good food and bad food without tasting the food). With tacit knowledge most experts in any particular field uses their senses to make judgments. In support of the above discussion, Oakeshott; Ryle say:

> If we contrast a cook who has practical knowledge of how to make a dish with one who has technical knowledge, the contrast will be more clearer, in that the practical cook will not be able to assemble and prepare ingredients, using timings, make measurements, but will be able to do these things in a way which a technical cook cannot. For them, probably the 'practical' cook will have an intuitive grasp of quantities, he/she will have a skills in assessing the quality of ingredients which are not available in the recipe book, and he/she will above all, be able to make changes to the way he cooks through his knowledge of the success of previous cooking particular dish. Furthermore he/she will also subtly modify his/her recipe to take into account his previous experience and the context of the current exercises in terms for example, of the known taste of guest or customers. However, the 'technical' cook on the other hand, will only be able to apply the recipe learned from a book or other source in a rigid and contextual insensitive manner (Oakeshott; Ryle cite Winch, 2000: 100).

In yet another example, Moll et al, (2005) emphasizes that in woodwork it becomes difficult for a crafts master to talk about a piece of furniture: "you feel good furniture when you make

it; you do it but is very difficult to tell someone how to do it, you just have to observe other people doing, and then try it yourself. That is how you learn to make furniture". Basically, a person becomes a master over a period of trials and errors.

The most important thing one learns is not what you are told, but what you learn by doing or by observing. For hand sanding, you need to feel the furniture to see whether a piece of wood which can be either a table or chair is rough or smooth. If a piece of wood is rough it means that it still needs more sanding, but if it is smooth then it is done. This example basically tells us that tacit knowledge requires practice mostly for one to master a certain skill and through practice it then becomes second nature.

Furthermore, in learning the skill of becoming a dancer requires practice; for one to become a choreographer (master of dancing) certain skill, and movements are required which is not easy for a choreographer to talk about or even write but can only do it to show others. Through observation people then get to know how he/she dances and be capable of doing it themselves through practice which enables them to master the skill of dancing. From the discussion above, we can conclude that experience in all cases plays a huge role in ones learning processes, which among others is appropriated through the process of apprenticeship and through working with a master practitioner for extended periods.

2.2.2. Explicit Knowledge

According to (Nonaka, Haldin-Herrgard, Cole and Rantasa, cited in Solomon 2005: 12), explicit knowledge has been referenced as "hard knowledge", codified knowledge, structured knowledge, articulated knowledge, verbal knowledge, declarative knowledge, and objective knowledge. In support to this (Nonaka, Nonaka and Takeuchi, Nonaka and kanno and Allee (cited in Solomon, 2005:12), point out that explicit or 'codified' knowledge can be expressed in words and numbers, and that such knowledge can be communicated between individuals in systemic ways, such as in form of data, scientific formulae, specifications and manuals.

Explicit knowledge can be defined as a structured, systemic and conscious of knowledge which is mostly taught in schools, university by teachers and lecturers. This knowledge can be explained by individuals even though some effort and some forms of assistance may be required to help individuals articulate what they know. In addition Rantasa (cited in Solomon 2005: 12) supports this by saying that explicit knowledge is easily communicated to others

and can be stored, shared, verified, and reused. “Explicit knowledge records individuals’ experience as facts or as sets of instructions that can easily be explained to others. Furthermore this explicit knowledge can be easily transferred to others by means of information technology systems, and can also be found in documents and other sources that can be found in libraries”.

According to Pan and Scarbrough,

> Explicit is systematic and easily communicated in the form of hard data or codified procedures. It can be articulated in formal language including grammatical statements. This kind of knowledge can thus be transmitted across individuals formally and easily. Whereas, tacit knowledge is not available as a text and may conveniently be regarded as residing in the heads of those working in a particular organizational context. It involves intangible factors embedded in personal beliefs, experiences, and values (Pan and Scarbrough, 1999:362).

Explicit knowledge is also important on its own since it makes a person go beyond imitation. One is able to think about what he/she is doing in a certain way as well as be creative as well. In most cases students may have a tacit skill (knowledge) to do something; yet, this skill in itself is not enough since it limits a student’s knowledge. It is sometimes the case that students cannot explain how they have done something. For example in a hospitality case study by Moll et al, (2005), Angie argues that it becomes important for students to gain broad knowledge which covers many aspect of cooking because it opens up a range of job opportunities. If a learner can only bake or grill, their job choices are very limited and they do not have a basic foundation for learning new skills on the job. It also teaches students to think about cooking in a creative way perhaps one can combine their knowledge of baking and grilling to invent a new recipe for pieces.

The same experience also applies in woodwork. In this case study, the lecturer tells his students that to avoid mistakes they need to be able to think and link drawings to practice. They must think about what they are doing, “Think about the furniture that you are making and the way people use furniture”. They need to know the overall size, height, width and depth as well as the thickness of the wood. This type of thinking requires some aspect of explicit knowledge, for example mathematics for the measurement (Moll et al, 2005).

To emphasize this, explicit knowledge is also significant, as it give a person a broader view and knowledge on what he/she is doing in a sense that a person becomes creative and can explain to other people how he/she did a certain thing. It becomes easier to share that kind of knowledge to others as it gives a person an in-depth understanding and meaning of doing a certain thing.

2.3. Communities of Practice

Wenger's theory of social learning focuses on the social process that makes learning possible with regard to the nature of social relationships and institutions within which learning is constructed. His focus is the idea of community of practice in which people engage together in a particular activity; for example, in a furniture factory, a group of skilled woodworkers working on similar problems, a group of people working in a call centre agency, and a group of hairdressers working in a salon.

Communities of practice share the concrete, daily practices by which work- including knowledge and practice (Lave and Wenger, 1991; Wenger, 1998). Accordingly, they share the tools that both shape and carry their work including the material bases of their work. They decide what is known, what counts as evidence, how an argument is constructed, what is considered proof as well as who decides, who speaks, and who is a competent observer. Communities grow and are transformed by educating and inducting new members. Learning is not simply a matter of knowledge transfer but of its construction and reconstruction in action, in interaction with a setting and with other people.

The important aspect in the theory of communities of practice is that of *legitimate peripheral participation (LPP)* which provides an account of how individuals learn in various occupational groups which are not characterized by formal training (Lave and Wenger, 1991). This term is drawn from the theory of situated learning which defines learning as a social process where newcomers are acknowledged and accepted by all members as unqualified and potential members of the practice. They do peripheral jobs and gradually get entrusted with more important ones through participation. Moll (2009:9) asserts that "the development pathway here is one that begins with apprentice on the boundaries of the practice to junior participants at the centre of the practice, to master practitioners who constitute the identity and maintain the boundaries of the practice". Furthermore, Lave and Wenger (1991:26) emphasise that *legitimate peripheral participation* provides a way of

speaking about the relationship between newcomers and old-timers, and about the activities, identities, artifacts, and communities of knowledge and practice.

In a workplace newcomers are acknowledge and accepted by all members as unqualified and potential members of the practice, they do peripheral jobs and gradually get entrusted with more important ones and it is through, participation, and doing knowledge that they acquire it. In illustrating Lave and Wenger's theory of LPP in the factory furniture, newcomers are given minor tasks to do especially if the novice does not have any previous experience. In woodwork, this means that they will be helping with delivery, painting, sanding, and stacking the wood as soon as it gets delivered from the truck into piles. In the process they are learning how to use various machines, and within this they also start using the machines that are not too complicated. In this regard, they gradually move from being novices to become experts in the field.

2.4. Assessment

Moll (2009: 15) explains that the theory of communities of practice has indispensable inferences for understanding the characteristics of assessment communities. It allows individuals to view expertise in assessment as a property of an expert community of practice to which novices gain access in practice over a considerable period of time which is the notion of the LPP.

What is assessment? Pahad (1997:5) "define assessment as the process used to decide if learner is competent or not. A learner must show that he or she knows, understand and can do whatever is required to demonstrate competence". In the context of the NQF, these requirements are called specific outcomes. Specific outcomes are spelt out clearly in nationally unit standards. Learner's progress is assessed according to these national standards.

Assessment is a very important part of teachers, supervisors and managers' work. In work places, managers assess the competence of their workers. Generally teaching is thought to be the profession where assessment skills are recognised as essential competence ability. As it were, the role of 'assessor' is one of the key role identities for all people who are educated. This includes all whose work focus on education, training and development whether in the workplace, school, universities and development programmes.

Furthermore, assessment is a major feature of many vocational programmes, the bedrock of a valid system of employment relevant qualification (Steadman in Marsh, 1997:198). To a large extent assessment activities are based upon summative and account ability purposes. Jessup (in Marsh, 1997:198) argues that assessment in vocational programmes can be more flexible because it can allow different kinds of evidence in real-life situations (workplaces) as well as instructional centres.

What is it that brings about the quality of assessment within communities of practice?
Moll (2009:13) argues that in the "communities of practice in a work place you will find that if the 'assessor' is an expert in the relevant field of practice of learning task, then she must draw on her expertise, which is the expertise of community of practitioners of which he/she belongs to in order to make the judgment that she must in order to assess the competence on the task which is possible the work of the novice".

However, without expertise knowledge or skill in the relevant field of practice from the production process in the workplace, to craft, to hairdresser, to school subject the assessor would not have a good eye in discovering the evidence that is required to make valid and reliable assessment judgment about learning, Moll (2009:13). Consequently, in assessing knowledge and skill, it is the judgement of expert in the communities of practice that counts as facts".

In the workplace, we can consider two types of assessment, *formative and summative*, which are taken into account during the activities which are done by communities of practitioners, these judgements are made by a more skilled person about the progress being displayed by apprentice as they enter and learn to engage in the practice (Moll, 2009:09).

2.4.1. Formative Assessment

According to Pahad (1997:45), "formative assessment helps to inform teachers about a learner's strength and weakness, and to constantly gives feed back into their lesson planning, and to guide the learners directly with relevant information". This is basically to find out the learners progress during their learning. There is formative assessment is the work place (communities of practice) where you will find managers always keeping an eye to check, and judge the work of novices. Moll (2009:9) says that such workers (novices specifically),

“internalise those judgment[s] from the manager which is their mentor as their own and their participation in the communities of practice becomes less peripheral”.

2.4.2 Summative Assessment:

Pahad (1997: 45) explains that the purpose of summative assessment is to summarise the level of achievement of a learners at a given time. It is an important aspect of assessment because it is concerned with a final summing up that is often used for grading or ranking purposes. This involves examination, end of the year report cards and so forth. More to this is the information gained from summative assessment has been largely used to select whether learners are competent enough to go on to the next grade or not, or a particular category of job or training course. Summative assessment in the communities of practice (workplace based) occurs when a novice participates reasonably in the productive activities of the community to be assessed favourably by its skilled workers or managers (this will mean that a novice will be doing his/her work accordingly). When a novice is judged or assessed unreasonably, this would mean not recognising his/her abilities resulting in him/her excluded from the communities of practice Moll (2009: 9).

2.5. Theoretical Framework

I have defined and discussed what tacit and explicit knowledge is, how each is acquired, using given examples. I have mentioned that tacit knowledge is the type of knowledge embedded in the person’s mind and body, which makes it difficult for one to talk or even write about it. Whereas with explicit knowledge, it can be codified and structured in writing; this type of knowledge is conscious, systemic, and planned to be taught to a group of people who could be students or any person. I have also discussed how assessment takes place in the community of practice. I will now discuss the theory of learning through which I examine how the mentioned kinds of knowledge are learnt. In order to do this, I consider three different theories of learning which have been influential in giving a particular understanding of what learning is and how it takes which is: Jean Piaget’s theory of equilibration, Lev Vygotsky’s theory of mediation, Jean Lev and Etienne Wenger’s theory of community of practice.

2.5.1 Theory of Equilibration

It is Piaget's model of how humans developed or acquire knowledge/understanding. Piaget's theory is grounded on the view that knowledge development or acquisition involves active construction on the part of the learner (subject) (Wadsworth, 1996; Hatano, 1996; Moll, 2002). Such an individual sense-making enterprise happens through mental functions as human beings are regarded as active agents of information processing (Hatano, 1996; Davis, 2004). Piaget according to Von Glasersfeld (1995) considered cognition as a biological function grounded on the organism's experience. Most learning therefore is primarily initiated and ignited by the learner's mind. What the laymen calls the mind, Piaget (1964:09) calls "operational structures" and it is through these that developmental of knowledge takes place (Biggs and Collis, 1982; Von Glasersfeld, 1995). Miller (1989:154) defines cognitive structures as "mental operations…necessary for understanding".

People do develop their structures primarily through the "fundamental and principal factor" of equilibration and other secondary factors like mediation, experience, transmission, motivation and prior knowledge (Piaget, 1964:10; Moessinger, 1978; Biggs and Collis, 1982; Hatano, 1996). Moessinger (1978) and Siegler (2005) elaborate on the notion of equilibration arguing that it is the keystone to the development of knowledge and through it according to Siegler (2005:38) there is an "interaction between existing ways of thinking and new experience" that results in the "elimination of perturbations" (Von Glasersfeld, 1995:67) and "overcoming resistance to understanding" (Miller, 1989: 156). According to Siegler (2005), Von Glasersfeld (1995) and Biggs & Collis (1982), equilibration encompasses both assimilation and accommodation, with the latter process being the more important of the two as it creates new material into already existing conceptual structures. Schiro (2008), Hatano (1996), Miller (1989) and Von Glasersfeld (1995) explain how structures develop through amalgamation, reorganisation, restructuring and integration between pieces of knowledge into a unitary piece. It is through the cognitive structure's framing and reframing that new knowledge is acquired. Structure development therefore is induced by transformation that overcomes resistance to learning and results in knowledge acquisition.

Operational structure development is connected to action; the two are interdependent and crucial in knowledge development and in ensuring understanding. Von Glasersfeld (1995), Miller (1989) and Piaget (1964) agree that cognitive structures are linked to action and play a complementary role to enable understanding. Action is either physical or mental and changes

the way a situation is experienced by a subject (Von Glasersfeld, 1995; Miller, 1989; Wadsworth, 1996; Piaget, 1964). In fact, we can say that it is an individual's action that propels knowledge development.

According to Piaget (1964:8) "to know an object is to act on it" and this primarily happens through an "operation". Such an operation is part of one's total structure, which also happens to be "self-monitoring" (Strohm-Kitchener, 1983:223). Equilibration which is a fundamental factor in knowledge development takes place when the subject is active (Miller, 1989; Piaget, 1964). There is a close and complementary relationship between structure and action and both led to transformation which ultimately leads to knowledge acquisition. It need be said that without action, structure cannot develop and without structure, action cannot be triggered.

For the purpose of understanding Piaget's theory I will use an example of woodwork to explain the link between structure and action where an apprentice acts on the object using his available knowledge (**schema)**, which in this case includes acting on the band saw machine to the extent that he knows how to do so and using the machine tool to change the shape or size of the piece of wood (**assimilation).**

As he does this, he discovers limitations in his knowledge of how to use the machine (tool), he discovers that certain things that he uses do not assist him, he makes mistakes, and he discovers that he is unable to do certain things **(disequilibrium)**. Therefore, he works with the machine make certain adjustment including the way he postures, the way he holds the tool, the depth and extent of cuts that he makes to the wood and the amount of force he must apply. He tries various options to assist him in achieving the outcomes (**accommodation).** Once he tries something new with the tool and recognizes that it is working, he practices it and consolidates it. It becomes part of what he now knows; somehow this is built into his very being through the experience he has had learning to utilize tools **(equilibration**). This example emphasises the argument made by Piaget that individuals learn through their actions, and our knowledge is built on what we know already.

2.5.2. Theory of Mediation

Central to Vygotsky's theory is the notion of mediation. Vygotsky is a social constructivist whose theory is anchored in "social interactionism" (Bronckart in Moll, 2002:13). His theory

therefore puts a major emphasis on the social origin of mental processes (Wertsch & Tulviste, 1996). Cognition according to Vygotsky is "social in nature" (Crook, 1994:32) and therefore "social interaction" (Von Glasersfeld, 1995: 67). It is through the mediating function that higher (human) mental functions are acquired primarily through "signs and tools" (Vygotsky, 1978: 54). Social interaction is therefore initiated and carried out via signs and tools and this involves and leads to the transformation of external interpersonal process into an internal intrapersonal one (Vygotsky, 1978). Vygotsky (1978:56), calls such a process or series of transformation Vygotsky ("internalisation". The notion of internalisation therefore is central and is a vital cog in Vygotsky's theory. Vygotsky follows Piaget in accepting the need for structure and action in knowledge development though he went an extra furlong and brought in a new aspect of social interaction into play.

Vygotsky (1978) cited various means for social intercourse with language or speech being the most important and common aspect (sign) that enables mediation. Other "external . . . outside of the person" meditational means are found in the local social and cultural life of a community (Crook, 1994:35). Among other notable means of mediation (tools) are diagrams, maps, drawings, notebooks, adult's guidance, peer collaboration and instruction (Miller, 1989; Wertsch, 1984; Vygotsky, 1986; Crook, 1994; Hedegaard, 1990). The latter meditational means is quite different from the rationalists' notion of instruction since instruction in the Vygotskian sense is "socially embedded", and plays a leading role at school where scientific concepts are learnt (Hedegaard, 1990; Vygotsky, 1986; Vygotsky, 1962; Wertsch, 1984). Instruction within Vygotsky's Zone of Proximal Development is closely related to development (Wertsch, 1991). Within the socio-cultural theory therefore instruction is a vehicle for knowledge acquisition that involves learners' action. Vygotsky's theory emphasised the need for social interaction and the social roles of teachers which leveraged children into understanding through co-operative, collaborative and joint learning initiatives (Moll, 2002; Vygotsky, 1962, Slonimsky & Shalem, 2004). An example from a furniture factory is appropriate in elaborating this thread of thought. A master craftsman gives instructions to guide his workers when making furniture, corrects them when they make mistakes, supervises them during the production process to make sure that customers gets quality furniture. In general he guides his worker on the path to become better, more skilled woodworkers, and for the sake of the business to grow.

2.5.3. Theory of Situated Learning

Lave's (1993, 1996a) theory of situated learning emphasises the importance of activity and learning tied to contexts. Learning, thinking and knowing occurs as an interrelated processes of the mind (persons acting), culture, history and the social context (Lave, 1993; Lave and Wenger, 1991; Hatano, 1996). The idea of action and social intercourse seem to have been borrowed from the cognitive and social theorists. Learning under this approach primarily involves activities in the social context. Learning therefore according to Lave and Wenger (1991) is an integral aspect of social practice under which there is always "activity…productive activity…and social interaction" (Lave and Wenger, 1999:30; Lave, 1993:66). Since learning occurs in social interaction, the term Legitimate Peripheral Participation is regarded as "a descriptor of engagement in social practice" and a "way of belonging" that reproduces communities of practices (Lave and Wenger, 1991:3435). Legitimate peripheral participation also leads to the development as well as the production of skilled people who fashion their identity in communities of practice ―start as "newcomers" and increasingly over time become "old timers" (Lave, 1993:70; Rose, 1999). Besides leading to the production of skilled and knowledgeable personnel legitimate peripheral participation also continue and perpetuates the practice.

Vocational skill acquisition under situated learning is distributed throughout participation in communities of practices (Lave, 1996a & 1996b; Hatano, 1996). Participation therefore is "a way of learning", which involves and concerns the whole person and his mind acting and interacting with and in the "lived-in World" (Lave, 1996a:7; Lave and Wenger, 1999:22). Situated cognition emphasises the heterogeneous and contextualised nature of knowledge that involves interactive activity and encounter with situations (Airasian and Walsh, 1997, Lave, 1996a).

Learning under the situated theory becomes a collective enterprise that at times involves conflict between participants (Lave, 1993; Lave and Wenger, 1999). In their writings Lave and Wenger (1991, 1999) cited apprentice practices as examples of effective and benign learning.

Situated cognition is also regarded as a democratic notion of learning that is liberating, empowering and emancipating (Lave, 1996b; Davis, 2004; Lave and Wenger, 1991; Brown

et al, 1989). In an educationally enriching move Brown et al (1989) argued that classroom learning and teaching must be situated as this coproduces contextualised knowledge through activity as well as provides essential, interesting and robust knowledge that enculturates learners into the authentic activities of the community of practice in which they negotiate meaning, construct understanding, solve problems and invent solutions.

2.6. Becoming an Expert in the Workplace

2.6.1. What do we imply by expertise knowledge?

The explanation of tacit knowledge leads to another area of knowledge or skills known as expertise. "Know-how" or embodied knowledge is a characteristic of the expert who acts, makes judgments, and so forth without explicitly reflecting on the principles or rules involved (Hurst, 2010: 5). Thus, the skills of a master, or expert, are difficult to codify, document, communicate, or replicate because they are the result of personal experiences. Tacit knowledge has not been learned from a textbook or even in a class, but only through years of experience (Hurst, 2010:6).

Research in the psychology of expertise is useful if we are to understand how invisibility-in-use is achieved through learning and practice. Work on expertise is rather expansive; for example looking at Klein (1998), who wrote about "the power to see the invisible." Perusing the decision-making and expertise literature in different domains, it is clear that the case studies he uses from chess are generally found in studies of referees, nurses, and pilots. This implies that expertise is in large part a factor of familiarity and experience. Klein reminds us that expertise is learning to perceive: experts see patterns that novices do not. At the same time, experts are keen at detecting anomalous behaviour. This leads them to see opportunities that novices don't see.

In addition, (McCormick and Paechter, 1999: 88) argue that "expertise is proficiency taken to its highest level, and understanding of the experts' hard-won knowledge and skill can be used to foster the novices' progress, and perhaps, to expand the proficiencies of expert themselves". Furthermore, he argues that the study of expert/novice differences in other domains has deepened our appreciation of the significance of experts' perceptions of patterns. This perceptiveness, we can now suggest, is one of the critical manifestation of an expert's highly organised, integrated structures of knowledge (McCormick and Paechter, 1999: 89).

This type of expert knowledge is tacit because it is based on experience, is context bound, and is not teachable (Dunn & Lozinski, 2005 cited in Hurst 2010,p.13).Tacit knowledge of expertise is often hidden behind intelligent action and acts at a subconscious level (Wagner & Sternberg, 1986). According to Magnus and Morgan (1999), "the master" has the ability to assess a situation and take into consideration many aspects at once using several processes. Research by Patel, Arocha, and Kaufman (1999:14) focused on the differences between subjects differing in terms of expertise. Among the expert characteristics revealed in their research are the following:

> Experts are capable of perceiving large patterns of meaningful information in their domain that novices cannot perceive. They are fast at processing different skills required for problem solving. They have a superior short-term and long-term memory for materials related to their domain of expertise, but not outside their domain. They typically represent problems in their domain at deeper, more principled level, whereas novices show a superficial level of representation. They spend more time assessing the problem prior to solving it, whereas novices tend to spend more time working on the solution itself and little time in problem assessment (Patel, Arocha, & Kaufman, cited in Hurst, 2010: 14).

According to Nestor-Baker and Hoy (cited in Hurst 2010: 14), an expert performance is viewed as being dependent on a large accumulation of knowledge, which allows insightful perception of a task. The knowledge base of experts also contains remembered impressions, emotions, and mental pictures, which are part of the knowledge structure and may be used in the decision-making process. This implies that the expert has a great potential to see the invisible or something that a novice worker might to see at that particular moment.

2.9. Transferring Tacit Knowledge

Given the fact that tacit knowledge is connected to the senses, personal experience, and body language, the transfer of such knowledge requires close physical contact while work is being done (Von Krogh, Ichijo, & Nonaka, cited by Hurst 2010: 25). Face-to-face interaction is crucial in order to capture a full range of sensations and reactions that are necessary for transferring tacit knowledge. For the most part, people describe what they know through words, but interactions also include body language which is all part of the acquisition of tacit knowledge. Even acquiring advice from experienced advisors provides students with training which is quite different from book learning (Magnus & Morgan, 1999). Conversations also allow people to share mental models. Crucial to that is exchangeable learning through actions and practice, which involves imitation learning by novices.

This literature review explained the nature of knowledge which is crucial to the study that is followed by a brief discussion on the distinction between tacit and explicit knowledge with several examples. Central to this is the theory of community of practice which is discussed. Furthermore, types of assessment is explained with illustrations by example; the theoretical framework for this study is discussed which entails a variety of relevant theories. In addition, studies of expertise are presented to help clarify how a person becomes an expert in a particular field and lastly, the transfer of tacit knowledge is explained.

Chapter 3

Research Method

3.0. Background

A research methodology is a road map that is employed by researchers when conducting research. It seeks to find answers to a research question(s). This research uses a qualitative approach because it well suited in answering the research asked in Chapter 1... This chapter describes briefly the selected methodology and motivated for the purpose of the study. The objective of the research method is to plan, structure, and execute the study in a way that the validity of findings will be maximized (Mouton, 1996:107; Mouton & Marias, 1994:32-33,193).

3.1. Research Participants

3.1.1 Setting

Ethnographic work across the SAQA project has been carried out in various workplace settings, ranging from hair care facilities, through various kinds of business environments, to factories that manufacture various products. For this study, the research was conducted in a furniture factory south of Johannesburg. The activities housed in the factory are the full f range of production and sales activities associated with the furniture industry –from the unloading of raw timber at the main entrance, to the selling of completed furniture to customers in the showroom. This setting was selected because it provided for study in a complex work environment that is involves in carpentry, as required by the research questions. These focus mainly on the transfer of informal knowledge from expert to novice, as well as the judgments made by experts when assessing the novice's work. At first, the researcher tried to build a strong relationship with most workers in factory, and then identified key informers among them for interview purposes. The most experienced and the least experienced workers were selected, for the reason that the researcher was particularly interested in the relationship between expert and novices in the furniture factory.

3.1.2 Sampling

The nature of sampling in educational research is a purposeful selection as the intent is to identify information-rich informants who can supply the data required to answer the research question (Crowley, 1994:95, 59; Huysamen, 1994:44; Neuman, 1997:209; Rubin & Babbie, 1993:369). Fetterman (1998:32-33) support this by explaining that "the research questions usually shape the selection of place and a people or program to study. First, a researcher chooses who and what not to study. Secondly, a researcher selects who and what to study that is, the sources that will most help to understand life in a given community.

In this study, a stratified random sampling was selected because it is suitable to the study particularly in finding valuable answers from selected participants to answer the research question of how tacit knowledge is transferred from a more knowledgeable person (expert) to a less knowledgeable worker (novice) and the judgement made by experts when assessing novices work in the workplace (furniture factory). McMillan and Schumacher (2006:122) explain that in stratified random sampling the population is divided into subgroups or strata on the basis of a variable chosen by the researcher, such as gender, age, location, or level of education, and once the population has been divided, samples are drawn randomly from each group. Given the fact that the researcher was informed before commencing the research at the selected furniture factory by the manager that work place was a very busy one, meant that some workers might not be available to participate in the interview sessions. It also meant that interviews might only be conducted during lunch time. This was not sufficient for the researcher. In this regard the researcher was given permission to interview only ten workers out of a total number of twenty workers who were more experienced workers. The problem was that the research sampling was not a balanced with reference to the knowledge of the workers. It also deviated from the researcher's aim which was to interview both skilled and unskilled workers in an equal manner which would have been five experienced and five inexperienced workers. The research ended up being inadequate in terms of the selection of participants (This is further discussed in detailed on discussion and limitation chapter)

Nonetheless a sample of **ten** workers was invited to participate in the study. This happened through the researchers' engagement with participants during structured and unstructured interviews and through observation. This sample seemed adequate and benefits the nature of this research project. Workers were selected according to their work experience which was

less and more. All participants were informed about the purpose, time constraints and confidentiality of this study.

3.1.3 Method

A qualitative research method seeks to answer questions by examining social settings and the individuals who inhabit these settings (Mason, 1996: 4; MacLeod, 1994: 77- 78; Taylor & Bogdan, 1984: 6-7; Creswell, 1998:15; Hammersly, 1993:17). This approach to research generates descriptive data from people's own written or spoken words and observable behavior within their natural context. The ultimate goal of qualitative research is thus to understand those who being studied from their perspective, from their point of view (MacKay & Schuh, 1991:424; Taylor &Bogdan, 1984:5; Gorman & Clayton, 1997:23: Hillteman & Simon, 1997:42, 1993:216-217). Jessor et al (1996: 306/7) explain that ethnography is the most important method in the study of human development because it ensures that the cultural place will be incorporated into understanding human's lives and the way they do things. Thus, an important goal of ethnographic research is to describe and understand the cultural place and its influence on the everyday lives of its members. According to Stephen et al (1999:1) ethnography is a scientific approach to discovering and investigating social and cultural patterns and meaning in communities, institutions, and other social settings. Hence, ethnographers discover what people do and why before they assign meaning to behaviours and beliefs.

A particular facet of the ethnographic case study – personal histories - was used in order to gather qualitative, descriptive data from participants to gain an understanding of their perspectives within their own context. For the purpose of this study, the researcher adopted a broad ethnographic case studies approach to the research, in concert with other members of the SAQA Research Directorate who were doing similar research. SAQA has developed a research programme which involves collecting and evaluating evidence from different workplaces. This research aimed at describing the basis of assessment expertise in communities of practice in vocational contexts, and to also understand the constitution and development of assessment expertise, thus an aspect of ethnographic case study was used as a tool to discover the answers to the research questions. According to (Best and Kahn 2006, pp. 259) "A case study is a way of organising social data for the purpose of viewing social reality, it examines a social unit as a whole. The unit may be a person, a family, a social group, a social institution, or a community. The purpose is to understand the life cycle or an

important part of the unit. The case study probes deeply and analyses interactions between the factors that explains present status or that influences change or growth."

In addition the study was primarily interested in understanding how tacit knowledge is passed on to novices and how assessment is done by an expert person in the field when assessing the work of a novice. Ethnographic research has as its broad aim the description and explanation of human action, perceptions and behaviour *in context that* is in a lived cultural or social context. While most of its data emerges from 'participant observation' it also employs interviews with participants to gather important data. This study works only with this aspect of ethnographic case study — the self reports of participants (the workers in a furniture factory) about their own learning histories. The interviews constituted

Du Plooy (2009) states that structured interviews are mostly (closed ended questions) and tend to have higher reliability as could be replicated, According to Fetterman (1998: 37-38), "Interviews explain and put into a large context what the ethnographer sees and experiences. They require verbal interaction, and language is the commodity of discourse". "Most ethnographers often employ formal and informal interviews these interviews generally serve comparable and representative purpose comparing responses and putting them in the context of common group beliefs and themes. Informal interviews are the most common in ethnographic work. They seem to be casual conversation, whereas formal interviews have an explicit agenda.

I selected this method as I deemed it a suitable strategy to find valuable information to answer the question of how tacit knowledge is transferred from experts to novice and the judgement made by experts when assessing novices work. I considered personal histories within the (ethnographic case studies) as a suitable means of collecting information to study my respondents since the goal of most ethnographers is to live and understand the behaviour of others in their own social perspectives. It is said that ethnography is one of the research methods used in a qualitative method for collecting data. It is also a practical method of collecting data because ethnographers participate fully in a particular community of practise.

This information was gathered in a way that the researcher then wrote a historical account of each participant's learning experience in acquiring tacit knowledge in a certain period. It has been mentioned by Mngqolo (2002) that by writing a history you may uncover information

about the past that you can't read anywhere else. Major events are not the only contributing factors to history; for this reason, it is important to include the stories and opinions of ordinary people. Today's events are still influenced by those of yesterday.

In this research the history of each participant was required in order to understand his learning experiences, as to how their skills shifted from being a novice to become a master craftsperson. The data presentation contains an autobiography of each worker both skilled and unskilled in the furniture factory. The ten autobiographies reveal the workers' learning skills in relation to how they have acquired tacit knowledge over a certain period of time.

3.2. Ethical Considerations

The research was approved by the Wits School of Education Ethics Committee. As in all research, permission into the workplace for the purpose of the research was negotiated with the managers and the workers themselves. All the participants signed a consent form which does not force them to do the research, they were allowed to withdraw at anytime and it confirms that they were informed about the confidential purpose of their participation in the research which is written on the subject information sheet (*See Appendices*).

Chapter 4

Data Presentation

4.0 Introduction

One of the main features of ethnographic data is that it is 'thick description" (Geertz, 1973). Using data-gathering techniques such as field notes, logs, interview transcripts, and records of self-reflection, the researcher puts together a range of rich, detailed qualitative data which can then be analysed and interpreted to establish patterns of social life and the meanings contained within them. This research report focuses on one particular source of data – self-reported personal histories - within a broader research enterprise, that of the SAQA research initiative on tacit knowledge in the workplace. The main purpose of this chapter is to report straightforwardly what the data was that emerged from these personal histories. However, it is important first to describe the historical development of the workplace as to how and when it started, and who was the main founder of the establishment as this can be useful in making the reader understand the notion of "tacit knowledge" being transferred from an expert person to novice and how the assessment process takes place. This is followed by ten autobiographies which reveal the workers' learning skills in relation to how they have acquired tacit knowledge over a certain period of time, and these autobiographies were revealed as a facet of an ethnographic study.

4. 1 Historical Development of the Workplace

The research site, the furniture factory, is not a training centre; it is a workplace that trains workers on its premises. Basically, employees learn during the course of their working hours, and they are taught different skills such as the use of different machines, painting, sanding, and putting the joints together (assembling). They learn all these skills on the job by observing an expert demonstration and following up on the demonstration in other words, imitating their more skilled and knowledgeable colleague. There are a total number of twenty workers in the factory. There were forty workers but the other half was retrenched and there is a combination of old and 'newcomers' workers. Some of the workers have been in the job for many years and some a couple of months. All of the employees are males. Most of the

employees personally asked for jobs and some were told by friends and family. Some of them did not have experience; they only learned on the job while a few were experienced workers. The furniture factory is a family business; there is a master crafts person (the boss) behind the establishment. He started the business in 1989 with his wife. After completing school, he decided to take over his father's small furniture business. He did not enjoy theoretical studies, however, practical studies made so much 'sense' to him as he was very talented by using his hands. He used to fix everything that needed reparation in his parental home and that was when his talent started to show. When he was in Standard 7 (Grade 9), he applied for an apprenticeship to a technical college. He did not matriculate during that time, and instead went to a special trade school for carpentry. It was not easy for him as he had to return to finish his matric while working. However, he managed to matriculate and went to John Orr Technical College where he studied for two years. He was allowed to split his coursework and he also took building construction as a course. He then built a building by himself and expanded his father's business even more.

'Both my father and my grandfathers were craftsmen. If they weren't dedicated to their craft, they didn't eat. They taught me about craft, about not just learning how to do something the right way, but about the right way to learn doing something' claimed the master crafts person. 'I recall the day that my father asked me to use a handy tool, mind you at that time I was only 10 years, he asked me to saw a piece of wood, and he just showed me how a rip saw works, he was holding my hands while I was cutting, telling me that I must hold the piece of wood tied when I am cutting to avoid skewed cuts, he then gave me to cut on my own. My father was standing just next to me while I was cutting, what I only felt was a smack on my head, "you don't watch do you? Shouting at me, first your positioning is bad my boy, you've got to… he would demonstrate…..the next minute he gave me to try again on my own still standing next to me, and guess what happened? I just got it that time…..even my posture was fine….he gave money for sweets, my father was a strict person, and when he teaches you something he expects you to learn immediately, with him learning was very difficult at first with all the punishment and the hidings that I use to get, despite that I learnt so much from that old man otherwise I would not be where I am today.'

'I always encourage my employees especially novices that there is one thing that cannot be substituted for in any craft and that is 'practice'. If you can't stripe 10 straight lines, you haven't practiced enough and you have no business trying to make designs. Find, learn and

live the 100 line drills. When that becomes second nature, then move onto simple designs. One thing at a time, ask questions, go to shows, panel jams and letterhead meets and watches someone who actually knows what they're doing. Learn a new stroke every week or a new trick once a month. Don't jump in with both feet. It is both detrimental to your over all progress and can be quite frustrating and demoralizing also' said the master craftsman.
The master crafts person has two children. He works with them in the factory as he is now too old to manage the business on his own. The son is a manager now and the daughter works as a secretary. Currently his job is to supervise and oversee the operation of the production process.

4.2 Working Site

As soon as I opened the door I could tell that it was a furniture factory, machines, the noise coming from the machines, the pile of wood stacked outside and everyone was busy working, concentrating on the machines. Workers were wearing blue and white uniforms (overalls), hand gloves to protect their hands, headphones to protect their hearing and their eyes were protected by safety spectacles.

The furniture factory building has three levels which I call the ground floor, first floor, and second floor. The work process is as follows: it starts with unfinished goods namely timber; it is supplied by Sawmill Suppliers, the biggest timber supplier in South Africa. The furniture is manufactured from solid South African pine wood. The work process begins when a huge truck delivers the timber to the factory.

The design and manufacturing begins on the ground floor where the **unfinished goods** are stored**.** Here employees do the rough cutting, sawing the wood into correct lengths, and sizes for tables and chairs. Thus, cutting wood is the primary process here. They use the cross cutter machine, the four-cutter, and the band saw, which together gives a piece of wood a shape. The first floor is used for manufacturing **semi-finished goods.** Here the main focus is machining joints (mortices) and the laminating of chairs. There is a standardized procedure that they follow when they are joining a piece of wood, and during this process they decide on which joints must be used for the chair, table which requires one to measure accurately. Drilling also takes place on this floor, opening holes for different components of the table, and chairs. The second floor is utilized for the **finished goods** where assembling takes place, in other words putting all the components together, basically the process ends with hand

sanding. Workers work interchangeable as they rotate, this means that even their duties rotate, this becomes important because it assists them to learn different skill that is require in every floor this helps them in avoiding slow production process in case one worker is absent.

4.3. Daily Routines: A Description of the Workplace's Cultural Practices

The workers work from Monday to Friday, and each day they arrive at seven in the morning and sign a register so that the manager knows who is present and who is absent. The workers begin working at 7:30 am. They have tea break is at 10:00 am (tea and coffee provided), and then half an hour later it is back to work until lunch time (12:00 - 13:00pm). They all leave work at 16:00 pm and 'sign out' on the register.

The factory has a siren which rings a few times signalling when it is tea break but when its lunch times it rings longer. However, the siren is also used as a form of announcement, for example when there is a meeting it will ring twice letting the workers know that there is an emergency meeting or an announcement to be made. When it rings three times it alerts them about the delivery for timber outside, those who are responsible for delivery will then rush outside.

The furniture factory has small separate rooms on each floor, so during lunch time the workers divide themselves into those vicinities to eat their food, and they also play cards game, they share their food amongst themselves. Workers learn through guided practice from the master craftsman; he coaches or physically directs their movement, they learn through their own trial and error adjusting their stance and motion via the visual and tactile feedback they get from tool and wood. During the production process while I was observing I recall the boss talking to one of the novices who was not able to follow the design of the template of a chair, as he was struggling to cut and measure the correct size, busy adjusting, stopping, and shocking his head… the master crafts person saw that the novice was struggling and he said, "The idea is to think ahead, visualize where you'll end up, what you'll need next and next after that".

After the boss had said that then he started asking the novice questions meanwhile the novice was busy cutting, "how do you measure? What angle to use when cutting on the crosscutter machines?" The novice responded to the master craftsman whilst doing what he was being asked for, "you first measure using a tape, as he was responding to the question he was

actually holding the tape and slowly placing it onto the template, and then placing it on the other piece of wood and he used a marker to mark the correct size, then after measuring the wood that he was using, he then cut the wood at a ninety degrees angle" then I heard the master praising him, 'you have got it… , well done ', 'you see its not magic' he said 'the idea is to mimic what you doing then you will do it correct, and if you need help shout…'.

4.4 History (Learning Experiences) of Ten Workers in a Furniture Factory

Historical learning experiences of ten workers in a furniture factory, which aims to identify and describe relevant learning experiences that show the development of the workers' tacit skills, knowledge and values which were transferred by an expert person to novices over time; through guidance, and every day practices.

4.4.1 Participants A

This participant was taught how to make furniture at a very early age by his father. His father was working in a furniture factory in Johannesburg for 10 years, he then retired and decided to come back home and start his own business in the Ngodini a township in Mpumalanga. Seeing that he's business was growing, he's fathers' employers then decided to open their own furniture business, and some were even making couches. "My fathers' business became so popular in the township that most families were teaching their children how to make furniture at an early stage, and mostly boys were groomed into this type of business" he said.

Participants A said that girls did not learn this craft because it was too demanding and rigorous for them. As mentioned above, for him training in crafts began very early. At the age of 8, he was going to the factory to work with his father, but he was certainly too young to learn anything, he remembers his father sending him to collect piece of wood which were stacked in sizes for cutting. "..I would bring incorrect sizes my father would tell me to go back and fetch the correct one even 10 times I would get irritated and cry at that time ...". At the age of 12 my father started teaching me the name of the machines and how it works. "I remember touching a stabling gun…. I thought I was going to hurt my hands….One day my father was busy stapling joints on a table and a chair…. he asked me if I can do it myself, I said ye! ye! Yes with doubts… As soon as I started to stable I dropped the gun down and my father shouted at me "you will break the gun!..." showed me how to staple and said to me I must aim the hole where I will be stapling, then he allowed me to staple again I still

struggled, however after a week or so I was able to stabled on my own. I can still recall that he gave me a 20c as reward for that I manage to do it on my own after he showed me".

This participant said that he learnt how to cut shapes, when he reached the age of 15 years, but still at this age he was not cutting accurately. "I recall one day when my father told me told me to cut a piece of wood…and that day I was lazy, somehow forgotten how to measure the size using a tape and a marker…. I thought that if I use the template only it will give me the exact shape as I did with other pieces of wood, but that day only day was my bad luck… I just noticed at the end that the piece that I have slashed became slightly smaller than the original piece, but I thought my father won't see that… when I told him that I was done he came….and the only thing I heard was a painful hiding at my back and he started shouting at me…" in woodwork you don't do short cuts my boy, you must cut exactly as I showed you…. Either you don't do it or you do it correct do you hear? And that was when I realized that you really can't cheat a master crafts person because they have a good eye for good for furniture….and by the time I became an adult (about 21 years of age), I had acquired highly technical skills to make furniture". "Having this much of experience from my father helped me a lot….because when I started working at this furniture factory learning was not difficult and adjusting in the use of various machines was not difficult at all because of the knowledge that I gained from my father" he said, for him this modern machines much easier and faster than the old hand tool…." He said that he started working at the furniture factory in June 1993. "When I came here there was no written curriculum or even a list of skills or tasks that had to be learnt. There were no written plans or procedures learning was from practice'. There were no formal tests or assessment, neither was there any requirement to attend school' clamed participants A we had to learn through observation each day.

4.4.2 Participant B

Participant B started working at the furniture factory in September 1995. After completing his standard 7, he worked at a bakery making bread. "The reason why I left there, it is because I was not registered as a permanent worker for a long time and the salary was little", he said. His friend told him that the furniture factory is looking for people to work. He went personally and asks for a job, and because they urgently needed people to work, 'I started working the same day, and I was given a uniform that very same day'. He was orientated and demonstrated the usage of different types of machines. "On my first day at work I was mostly doing practical observation… the use of machines and how to keep safe from injuries I remember my boss warning me about the crosscutter machines and he told me that most

people lost their fingers, he said this machines needs you to concentrate 100 percent, because if you lose a slightly focus you gone… "I started learning as I was doing watching my boss doing it and doing after him…. it took me at least a month or so to learn" because I came in the factory with no experience in woodwork…. I remember I was very slow when I was using the machines and extra careful when using them seeing that the machines could be highly dangerous as my boss warned me…. the first machine that I used was a drilling machine…I was very scared as I thought I was going to drill my finger by mistake" he said. Learning to drill in a straight line is also a vital part of woodworking. "I remember one day I was busy working on the drilling machine for the first time, the driller opens hole and drills horizontally for the joining components, I struggled to make the correct measurement of the hole to drill but I kept trying hard until I got tired then… Then I start shouting for help, but because of the noise coming from the machine they did not hear me. I then decided to go to Participant A to ask for help with the drilling machine, participant A showed me where I went wrong first, and he said to me as he was using his hands the problem here was that you did not measure (he was measuring the holes as he was speaking) correctly because usually the angle must be exactly ninety degrees to the surface…and any deviation may mean that the final pieces may not fit together correctly". Drilling became part of me because; I was drilling holes tables and chair without measuring.

4.4.3 Participant C

Participant C did not have any employment; after completing standard eight he signed on as an apprentice. This participant started working at the factory in April 1999. He obtained the job through his brother who was working at the furniture factory for many years, but his sibling decided to retire. 'I was not given training and had to learn through observation and by imitating the boss demonstrating he said'….I started by doing small duties such as painting and packing pieces of wood.

When I was in high school I used to enjoy mathematics the most, that is the calculation, adding, subtracting etc, and what I enjoy the most about woodwork is that it makes me think especially when it comes to measurements, the size, length and width that he will use when cutting a piece of wood, and also when they give him a number of legs for tables or chairs to make for joinery', He said. I remember one day I was busy cutting a piece of wood, I was cutting it for a long time, and my boss saw that I was struggling to make a correct shape. I kept making cutting incorrect shapes; kept measuring incorrectly….I did not know that I was

measuring incorrect shapes until my boss started shouting! Hey participants C come here... (Calling to come where he was)….whenever the boss call you everyone keeps quiet because they know that you are in trouble...as soon as I was close to him he started screaming…. "I am showing you for the last time listen to me carefully and look, you not suppose to hold it like that…(taking the piece of wood to my hand and demonstrating), he was works far from everyone of us but I am telling he had a good eye to see every one of us specially when we were struggling or making incorrect shape in a piece of wood even when we were working on a machine,… he continued shouting 'first you need to adjust the wood, then change your posture so you can cut the wood easily, then cut from a 90 degrees angle…after he had showed me I then made sure that I do not make less or more of those legs when cutting and measuring, I have developed a skill that I cannot explain to anyone I do not know how I do it but I don't measure using a tape anymore, I use my mind and eyes to measure. In order for one to measure accurately, it requires practice most of the time, so you become knowledge in mathematics; you also become creative in terms of making the actual design etc. "This does not happen overnight, it needs some practice and trough practice it becomes part of you". He said. After my boss has seen that I have developed so much skill he allowed me to also work with joinery and polishing.

4.4.4 Participant D

Participant D started working at the factory in January 2002. After completing standard 6 he went to some training centre program (workshop) in Mpumalanga for carpentry. There he completed and obtained a certificate of attending a one year course in carpentry. He had experience because he also worked at a soda (cool drink) company. "I knew most of the designs and it was much easier for me to learn other things such as using the machines, but mostly I specialized in assembling (sewing of materials to cover chairs and sanding)". Even though I had experience, I still had to learn by observing another person demonstrating how to use a particular machine. Like in most factories when you are a new employee you are expected to do the minor duties first, so I was a sales man showing the customers different furniture and taking orders. This participant says that passion drove him to do carpentry. "I am very passionate about work and I believe that passion and interest goes hand in hand for one to produce good quality products". He said. When we have a new employer (novices) in the factory , the first thing that I look is passion and willingness to learn, because I know from my experience that if a person enjoys his job his more likely to learn fast and do things correct…..

"I recall one day when the boss was testing my knowledge, he demonstrated how to assemble a chair using fabric and to stable the fabric on the chair, and he even explained the two types of sides of materials one side is a grained, and the other side is soft. Then he allowed me to do the on my own chair. I designed and made the chair for a good 5 days, when I was finished I took the chair to show him, the first thing that he asked me was that if I was happy with what I have done, and I said yes I was happy and I have put so much effort in it, and I did not have my lunches for 5 days I was very busy with chair, I claimed, and the boss replied by saying that he was not happy. I asked him why frowning my face as I was not seeing anything wrong with the chair, then the boss started fuming, and use his hands showing me the different from the back of the chair to the front, for some reasons I still did not felt anything wrong, then he explained by showing me that when you stabled the cover of the chair, you must always take notice of that if the back of the material is the grained side it should be the same for both the back and front, but if you using the soft side of the material then it should be for both the back and the front, but yours is grained at the back and soft at the front which is the sit. What he did, my boss smashed the chair, and told me that I have to pay for the waste material; I was very hurt that day."

4.4.5 Participant E

This participant has been working at the factory for twenty four years and before he obtained the job at the factory he was working at Max Ceiling. He did not have any background in woodwork. 'I started working as a delivery person in the factory delivering furniture to customers in the houses; I then learned most of the work through demonstration and practices (learning by doing). He was given informal training; I had to look and imitate my boss each time he is showing me how to cut and how to use a machine. It becomes very difficult for me to adapt, but if only I had some experience maybe it would have been much better, he said. . "…I recall a day when the boss was directing to offloads timber. He asked me to offloads the timber from the truck, and to stack the timber in piles, he first showed me which bundle to bring first, according to sizes. As he was observing the whole process of delivery from he noticed immediately that the timber was not balance that I did not pack them according to sizes to make it balance, I don't know how he saw that but he did (laughing). He then stopped me and shouted, he was so angry because he told me to pack according to sizes and I did not listen. The boss then said to me moves backward so it can be easy for you to push it up, no! No! don't go to the left the wood will fall because it is not balanced, after all that he came

into the truck to show me how I am suppose to pack the wood, it took me some time but I eventually got it through practice, then I asked him one day that, how does he know that it is not balanced. He responded by saying he can see from where I was standing if it is not equal from the sides and it might fall he replied, I ask him how did you learn to balance and see balance from far, he said I have been here for such a long time now and I can easily tell if something is not right, the novices needed to make sure that the wood is piled up properly according to sizes to create a balance says the boss".

4.4.6 Participant F

Participant F comes from a small town in KwaZulu Natal called Vryheid. He moved to Johannesburg in 2001 and was working in Pretoria National Zoo in the department of nursery where he was responsible for garden maintenance and layout decorations. In 2002, he decided to study for carpentry for a year at a technical college in Pretoria where he completed the course. He was told by a colleague that the furniture factory was in need of workers and that was how he got the job. He has been working at the factory for seven years now, and he has learnt so much. "When I started working here I was doing minor tasks such as sand papering and painting. I recall a first time when my boss asked me to paint a chair, and he was standing next to me to see if I was painting correctly I started painting the chair outside, and I looked at him shocking his head, and I was wondering why he was doing that because I did not see anything wrong I was doing then I finished painting outside of the chair…. Just as I was about to paint inside touching the chair and turning it upside down, he stopped me and hold my hand, and he asked me pointing at the chair look! Look! What have you done? Still I did not know what I have done I could feel my heart beating very fast as I thought that I was going to be fired, he showed me my finger prints on the outside of the chair and he said aha! you see to avoid this next time you need to paint from inside then outside and avoid touching were you have already painted with your fingers, because when you start inside it won't be neat, it will be very untidy', then I asked my boss what if I paint starting from outside and wait for it to dry before I finished the sentence, he freaked out and said immediately, no! No! You can't do that, are you crazy? You will be delaying the production process and my business will lose. Since from then I realized that there is so much difference between theoretical learning and practical learning with my school knowledge I still had to learn more thing by doing them because I really acquired more knowledge by doing the actual job, and I found practical work as easy to understand and not easily forgotten because it is when I am

actually performing the task. I am doing much more tasks now such as sand papering and so forth.

4.4.7 Participant G

This participant started working in a restaurant at the age of 14 after finishing Grade 7, he's family did not have money to pay for his school fees, his eldest brother was working at the restaurant, and he was the one who got him the job. I remember when I started I used to get paid weekly R20, 00, and my duties were to clean (wash dishes and cleaning the floor) however, I then begin to do much more bigger duties such as serving, coking, and end up being a bar tender and my pay went up by R10, 00 meaning I was earning R30, 00 weekly". He said that the restaurant was a Portuguese restaurant, so most Portuguese people were eating there. "I remember there was a guy I use to serve always when he comes to the restaurant if I am not there he will ask where I was, looking for me to take order and serve him special. I then got use to idea of serving this guy whenever he comes. One day, the very same guy told my brother that he want to give me a job at his furniture factory, and he promised to pay me more that I was getting at the restaurant, and my brother told me about it and I agree. I went to work at the furniture factory; there I also started with minor tasks like cleaning the floor. I became curious in a way that I was actually looking and observe at my colleagues who were working on different machines, doing the actual production of furniture making. Every day I would first complete my job quickly and I would offer to assist them with sewing of the cloths to cover the table and chairs, and as I was learning needle stitching, covering a chair, basically assembling. "I remember the day when I was stabling a piece of fabric to a chair and I did not realize that the measurement was too small for the chair, and I stated struggling to fit it on the chair to cover it, and my boss call me from far, as he was calling me he was coming closer, all I heard was him grabbing my pants and lifting me up, see I was a young boy, short and very tinny, then he said what bullshit! Have you done here? (pointing at the chair), he put me down and gave a hot smack on my face, I tried to explain and I was even stuttering he did not what to hear what I was saying, then I run to the toilet, I felt like quitting the job saying to myself even my father never smacked me like that, but because I wanted to learn so much in woodwork I went back and redone the chair correctly. As times goes on I was very good with cutting, joining basically making a chair from the beginning till the end of the production process became part of me, I thank my boss for teaching me so much skills, I became his favourite, he always chooses me to work with him overnight or weekends, he trusted me so much that he would actually tell me what to do and

leave me at the factory. My boss had a good eye to pick up wrong things, he always said do it the right way or do not do it at all".

4.4.8 Participants H

Participants started working at a butchery in March 1998, he worked at the butchery for five years until the owner decided to close the shop down because he was leaving the country, and that was December 2003, he was then jobless, but because he had a family to look after then he decided to fix people's shoes, and then he also was fixing everything that was breaking in his house such as tables, chairs, electrical appliances, and he was even painting peoples' house. He realized that he can actually do so much with his hands, then he saved money to go to a carpentry school, he learnt carpentry for about 6 months then he could not finish his studies due to financial crisis, he then decided to look for a job in woodwork. Fortunately there was an advert in a news paper that they were looking for carpenters to work at a furniture factory, he went the following day and he was employed. I started packing all the materials fabric, and doing panting and sand papering. 'My first machine to learn was a router, it is a woodworking tool used to rout-out (hollow out) an area in the face of a piece of wood it also is use to give different shapes and decoration'. "I recall the day that I learned o use router, I observed one of my colleague who's been in the factory for long routing, after he showed me how to route he then gave it to me to route on my own. I was routing a piece of wood that was supposed to be joined in a table, as I was routing he did not explained anything to me, he showed me how to. He wanted me to see first and then imitate exactly what he was doing without any instruction be said, the idea was to see or perhaps find out pace, so that he can place me according to my speed. I then begin to route , he immediately stopped me, and said the first thing you did wrong is the position of your posture which is not suitable for using the machine I remember when he asked me that 'is that the correct way of standing when using a machine?' Clearly I never saw anything wrong because I continued standing in a same way instead of standing straight and then bend a bit closer to the machine with legs open a bit, then I continue to holding a piece of wood with one hand, which was a big mistake because what happened was that as soon as the router machine begin to rout the piece of wood flu very fast away from him to the ceiling and then it fell down. Everyone kept quiet then he explained that whenever I am are routing a piece of wood always check my posture and then hold the piece of wood tight against the rout with two hands the start routing. Through practice every day routing became part me, I have been working on this machine for so many years now.

4.4.9 Participant I

Participant I's friend was a driver at the furniture factory. He used to deliver furniture in different places, so he was told by his friend that they need people to work at the furniture because at that time he was stressed and unemployed. He then started working at the factory in August 2007. He did not have any clue about woodwork. When I came here I was assisting with joinery of tables and chairs using glue. I had to learn on the job, learned by observing and doing what my boss was demonstrating every time he showed me what I needed to do on different machines. "The boss use to say I only demonstrate once not twice so look carefully each time he demonstrated", when I came to the factory It was very difficult as It was my first time working with wood because I did not have any idea about the job; however being around with such knowledgeable people who assisted me anytime I needed help me adapt. 'I remember the first time that I learnt to sand using sandpapering, my boss call me and said that I must finish off a chair that he had already started to sand (hand sanding), he showed me that he has finished sanding half of it I must finish the other half because he has to rush somewhere, before I begin he showed me that when I finish it must me evenly smooth, and I said yes sir and then I begin sanding, as I was sanding I realized that I really did not understand him when he said it must be evenly smooth (kade ngingasazi kahle isigisi) meaning I did not understanding English properly the time I started working here. I continue to sand by the time that I finished he was back at the factory, he came and all he when came to me he touched and touched again and he shocked his head, he immediately grabbed my hand and sand can you feel the difference I said no because I did feel any difference and thought it felt the same way as the other half, he went and call one of my colleague who has been in the factory for more than 20 years, and he asked him to feel the table, and he just responded by taking the sand paper and hand sand where he thought it was not sand properly after that he said to me, you can feel it, if it's gruff, it's still need some more sanding but if it smooth it means its finished, so basically you use your hand to feel the smoothness of some good furniture, by looking and feeling you can tell if it's done correctly. I asked him how he can tell if the table is sand properly, he replied, first for sanding I can feel it (touch it) to see if it's rough or smooth, if it's done properly it is going to feel smooth as I touch it, but if it's not done properly it will feel ruff as I touch it. However, sanding unevenly create gouge in an otherwise relatively unsmooth surface, and this is what you have done here, I then asked him that my boss mentioned the word evenly but I did not understand him what does the word means, it means it may be equally smooth. My boss asked if I have learnt from my mistake

and I said yes. He bring a table and I must sand and finished before I go home and that it was 30 minutes before we knocking off and I thought that was just a punishment.

4.4.10 Participant D and F

Participant D's (expert) teaching method was to demonstrate, then for a short while to offer guidance whilst the participant F (novice) practiced, then to leave him to experiment whilst remaining nearby so he could ask for help when needed. Whilst participant D struggled to explain what he was doing during the demonstrations, once participants F had gained some initial experience he was able to question and draw from him the help he needed. For example, when participant D was demonstrating grinding for the very first time he did not attempt any sort of description, simply saying, "You've just got to …" and then demonstrating. When participants F asked him how he knew that he was putting the blade on the stone at the correct angle, he floundered for words then said, "You just feel it." He then started to grind the other side of the blade to see if he could come up with something more descriptive, but again all he could say was that he could feel that it was correct. Participant D found a means to communicate once participant F had his first short experience of grinding. He watched him quite closely, had a look at the blade he had been grinding and they agreed that he needed to be holding it at a flatter angle. Then, by miming the action, he suggested that to feel the angle at which the blade was on the stone participant F should use a small rocking movement of his hand holding the blade. Participant F conferred back to him, "If I do that a little bit I'll be able to feel where I am?" and she mimicked the action with his hand. Participants D agreed and he proceeded to experiment with the technique.

4.5 Conclusion

This section of the data presentation has generally discussed each apprentice's learning experience, for example, how they have moved from being a novice to being an expert. It is important to take into account the learning experience has generally been accounted for through practice, through trial and error and through instruction by the supervisor.

Chapter 5

Data Analysis

5.0 Introduction

This chapter presents an analysis of the transfer of tacit knowledge and assessment based on the historical (personal learning history) data that was collected from each of the participants at the furniture factory about their learning experience in acquiring tacit knowledge. Central to the analysis are the learning theories which have been elucidated earlier in the review of literature chapter. According to Ely (1991:23) "to analyze is to find some way or ways to tease out what we consider to be essential meaning in the raw data: to reduce and recognize and reorganize and combine so that the reader share the researcher's findings in the most economical, interesting fashion. Thus, the product of analysis is a creation that speaks to the heart of what was learned". The researcher sought to develop an analytic device which aimed to find a common pattern among the workers' learning experiences as well as the acquiring, and transfer of the tacit skill in the factory furniture.

This device takes the form of a table which captures various moments in the way a novice learner acquires craft knowledge and skills in the workplace. It is based on Lave and Wenger's (1991) conception of *legitimate peripheral participation.* Instead of looking at learning as the acquisition of certain forms of knowledge, these authors position it in social relationships by using the term *legitimate peripheral participation*, which provides an account of how individuals learn in various occupational groups which are not characterized by formal training. The term draws from the theory of situated learning understands learning as a social process whereby newcomers are acknowledge and accepted by all members as unqualified and potential members of the practice, they do peripheral jobs and gradually get entrusted with more important ones and it is through, participation, and doing knowledge that they acquire it. (Refer to page 2.5.3 in the review of literature chapter).

Wenger (1998) provides an account of how novices enter a community of practice, from initial, total lack of expertise at the periphery of the practice to the acknowledged expertise that constitute full membership of the community at its centre. This theory of learning focuses on the social processes

that make learning possible, and in particular on the nature of the social relationships that a learner engages in gradually becoming a recognised and skilled member of a particular practice. Based on a reading of Wenger's text, and in discussion with her supervisor, the researcher arrived at the following conception of stages through which a learner passes as he/she acquires tacit knowledge in the workplace:

Encountered When did the learner first encounter the practice? Under whose guidance or influence?
Experienced How did the learner experience the practice initially? Were more skilled members of the community of practice involved?
Mediation Through what processes was the practice mediated to the learner? Who was responsible for this mediation, and how did they do it?
Internalised At what moment did the learner acquire the skills of the practice as his or her own knowledge? What evidence is there of transition from 'outer' to 'inner' speech (cf. Vygotsky, ref.)
Consolidated What independent activities does the learner engage in that demonstrate full mastery of the practice?

Figure 1: Stages of Learning.

5.1 Stages of Learning

These stages can be understood in the following way:

5.1.1 Encountered

Apprentice learners begin by observing the simple aspects of a craft from his master before moving to the complexities and intricacies of the craft. For example, he/she learns the names of tools, machines used before being asked to handle (Wood, 2009). He/she learns how different machines work: for example, that a drilling machine makes holes in a piece of wood, that a crosscutter is used to cut a piece of wood to give it shape, that sand paper smoothes the tables and chairs, and so forth. The data from this study shows that most of the workers, including the boss himself, started to learn by first doing minor tasks under supervision, such as stacking wood, cleaning, delivering furniture, assisting with painting, cutting small pieces of wood, as well as selling the furniture. This makes the person to be more familiar with the job and it also prepares them to do major tasks. As Participant A mentioned during the informal interviews, he was taught by his father at the age of 12, his father taught him the names of the machines and how each machine functions, as well as safety principles before he started work on it, as time and years goes on he stated to use the machine such crosscutter, drillers and so forth (Ref to table of analysis pg.61-65). It is evident from most of the workers experience that their skill started to develop as they were introduced to different machines to work with. This then leads us to next stage, which can be further understood in the light of theorists who discuss how individuals construct new knowledge -in this research the task is to find out how the furniture factory workers construct new understanding.

5.1.2 Experienced

Piaget's theory of learning focuses on how individuals construct new understandings when confronted by unfamiliar objects or task. It provides important insights into what happens when a learner first encounters an unfamiliar practice. According to Piaget (1964:15) "Knowing an object, or an event, is not simply through observing it and make a mental copy, or image of it , but rather to know an object is to act on it, to practice, to modify, and to transform the object": knowledge is not viewed as a copy of reality. Piaget points out that this is because learners seek to adapt to a new environment, a situation which they encounter, and in this regard 'equilibration' occurs in order to construct new knowledge and understanding. Moll (2004) illustrates how equilibration occurs, "…the cognitive system ... is characterised by certain inherited physical structures, which particular functions, that allows a certain level

of intellectual operations to 'emerge' and that are transform into more complex structures through development" (Moll, 2004). Equilibration takes place through a process of adaptation, that is, assimilation of new information to existing cognitive structures and the accommodation of that information through the formation of new cognitive structures. In general when a novice begins work as an apprentice, for instance, in cutting a piece of wood, the apprentice organises this knowledge through assimilation and adaptation in the context of observation and practice. When the apprentice reaches equilibrium, he has learnt the skill. The following concrete illustration of Piaget's theory is drawn from the experience of participant B who learned how to drill for the first time. Participant B was busy drilling a piece of wood in an horizontal angel, as he was drilling he struggled to make correct measurement of the holes for joinery, he kept trying, adjusting his position, changing the driller machines, shocking his, we discover that he tries so hard to drill the piece of wood using his current knowledge which is (**schema**) he makes mistakes, and he discovers that he is unable to do certain things **(disequilibrium)**. Then he tries various options to assist him in achieving the outcomes (**accommodation),** he got tired and he decided to seek for help from the boss.

Participant B who has already have the cognitive structures necessary for using a drilling machine when drilling a piece of wood he will have some of the structures necessary for joining all components in order to finish a chair or table, but they will need to modify their existing structures to accommodate the newly acquired information to solve the new type of problem. Thus, learners adapt and develop by assimilating and accommodating new information into existing cognitive structures.

5.1.3 Mediation

However, new skills and new understandings are not acquired in "splendid isolation". Given the experience of how workers construct understanding of using machines, we discover that during their learning they come across obstacles when using the machine and they only overcome them through assistance or guidance from a knowledgeable colleague and the boss. Vygotsky's theory of explains on how individuals construct learning in a relationship with other people who are more knowledgeable and skilled than they are, and who mediate new understanding and practices to them. Moll, (2002:17) supports this by stating that Vygotsky is "primarily interested in a notion of social construction to explain how the child is capable

of constructing new knowledge with the help of more knowledgeable individuals" such as teachers and parents. In his theory he argues that the society and social interaction are vital in the learning of new knowledge. Individuals cannot exist in isolation from the society. "The child's development shows us that from the very first days…. adaptation to his/her environment is achieved through social means, through people surrounding it", (Vygotsky & Luria quoted by Moll 2004: 11).

An example taken from participant C illustrates this well. He was using a cross cutter machine to cut a piece of wood for the first time -as he was cutting he would stop because the shape of the wood was skewed in a way, he kept trying to adjust it, measure the piece of wood using a tape, but still the shape was either skewed or wider than the normal size, he would take the template to make measurement but it was still the same problem. He then sought help from one of his colleagues.

A router is a woodworking tool used to rout-out (hollow out) an area in the face of a piece of wood it also is use to give different shapes and decoration, this example is taken from participant H experience on using a router machine, participant started routing a piece of wood on the edges to make a shape as he was routing he realises that he is not getting the shapes that he want to, he stopped and position himself, but still struggles to get the shape, he decide to use one hand to hold the machine and the other to push the piece of wood, and that was a big mistake because what happened was that the piece of wood flew away because of the speed of the router machine and he still struggled to make the correct shape around the edges, he then decided to ask for help from his colleagues. It has been revealed from the data that most workers and the master crafts person where taught to make furniture by their fathers, grand fathers, lectures, teachers, and colleagues. Most of them learned on the job through observing the boss, or colleagues demonstrating to them.

The work is done under a true master craft person, both as a woodworker and a supervisor**.** "I came here as an apprentice with little knowledge, but will leave here as a friend and colleague, very confident of my own abilities as a woodworker", participants H.

5.1.4 Internalisation

The master craftsperson in the factory suggested the following:

> The work is not often easy and the task is not often simple, but it is the challenge that makes an apprenticeship here such a singular learning opportunity. After all, one does not enter furniture making to live a sedentary life, nor does one seek to educate themselves without a challenge. You may think you know a skill, but in woodwork you quickly find the holes in your knowledge. This allows you to fill them much faster than you would through your own experience. Novices often bring a different perspective that forces the expert to approach a problem from a new angle. Teaching is a learning experience for both the novice and the master craftsman, and helping novices has allowed me to progress much more quickly than I would have otherwise,

For him some novices are slow and some are fast. In the next paragraph I discuss how these workers internalise the knowledge that they acquired through trials and errors as well as through the help of an expert.

For Vygotsky and Piaget the construction of knowledge is, so to speak, *vice versa*, Piaget, believes that new knowledge is constructed internally, by which he implies that it proceeds *inside-out,* and this results in development proceeding learning Marti (1996:58). This would mean that an individual constructs (builds) new knowledge as it arises from his/her cognitive mechanisms that already exist. From these 'inside' cognitive domains, external factors (social factors) are brought into an individual's mental structures to further help a person to modify and re-organise new constructs.

Furthermore, Piaget (1964) explains, two major principles guide intellectual growth and biological development: adaptation and organization. For individuals to survive in an environment, they must adapt to physical and mental stimuli. Assimilation and accommodation are both part of the adaptation process. Piaget believed that human beings possess mental structures that assimilate external events, and convert them to fit their mental structures. Moreover, mental structures accommodate themselves to new, unusual, and constantly changing aspects of the external environment.

Piaget's second principle, organization, refers to the nature of these adaptive mental structures. He suggests that the mind is organized in complex and integrated ways.
The simplest level is the schema, a mental representation of some physical or mental action that can be performed on an object, event, or phenomenon.

For Vygotsky, internalisation is seen as an *'outside-in'* process. The emphasis here is first on the role of society: as Marti (1996) says,' the child first establishes relationships with others and these relationships, once they are internalised, they constitutes basis of the child's cognitive processes.' Here the society plays a crucial role in the internalisation of new knowledge. To illustrate the above point, Vygotsky (1978:84) gives an example to say that… "Children begin to study arithmetic in school, but long beforehand they had some experience with quantity-they have to deal with operations of division, addition, subtraction, and determination of size..." this example emphasises the role that a society play in the construction of new knowledge of children.

This leads us to what Vygotsky calls the Zone of Proximate Development (ZPD) in his theory of the "Zone of Proximal Development" (ZPD). "Proximal" simply means "next". He defines it as those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow…. These functions could be termed the 'buds' or 'flowers' of development (Vygotsky 1978:86). These 'bud' or 'flowers' as I understand them, signifies learning in progress, and this will involve teachers, parents to guide and probe. Social interaction is very vital in construction of new knowledge as we have mentioned above. As children grow, so their cognitive development takes place on the basis of internalisation of social structures of knowledge to become their own individual structures of knowledge.

Both ideas about internalisation can help us to analyse the transfer of tacit knowledge in the workplace. According to Vygotsky (cited in Moll et al, 2005:106) mediation plays an important role in knowledge and skill acquisition. Vygotsky sees the notion of teaching as mediation, in that a teacher, a lecturer, a master craftsperson, or even an adult person basically someone who is more knowledgeable is seen to mediate, or to interpret and pass on to the student, learner, and novice the knowledge that a community has built over time. The data shows an example of the process of mediation of the participants' experiences in woodwork. Most of the workers were introduced to woodwork at an early age. For example, the master crafts person was taught by his father at a early age as well as participants A, he then went to study further at a trade school of carpentry, he also use to repair anything that needed reparation in his house. It has been revealed in the data that most workers even those who did not go to study further were also working in places they were using their hands frequently and they were most familiar with the factory set up, such as participants B, who was working at a bakery (making bread) participants H who used to fix broken tables, chairs

as well as couches and appliances at home. Even though some did not have a background on woodwork they had prior knowledge about certain thing such as cutting and painting, they had to build on this knowledge. In addition, those who studies woodwork also said that what they learnt was mostly theory at the trade school, but acquired most of the skills in the furniture factory. There are two things which are immediately evident in learning as an apprentice. Firstly, that one can learn through experience of imitation. Initially, you learn something by observing a skilled person doing it. This provides the basis upon which you can improve your own skill to become an expert eventually. Secondly, although some of the apprentices had gone to school, they had learnt only the theory of for example woodwork, but by combining the theory and by imitating or observing they acquire skill and competence, which they begun to externalise in their actions, in other words practicing the newly observed skill. Accordingly, this ties in well with Piaget's theory of learning; namely, that we learn through our actions, this is to say, that through experiencing the knowledgeable doing it, this knowledge is organised to become part of the apprentice's mental map through assimilation and accommodation as explained previously. This play between what the apprentice knows and what is not known is actually the basis of learning a new skill because the apprentice always aspires to learn either news ways of doing something, or to produce a better product.

5.1.5 Consolidation

Wenger's theory of communities of practice helps us to understand the point at which a novice learner ceases to be a novice: he becomes a full accepted member of a community of practice. It is also particularly important in understanding assessment practices in workplace learning — various members of the community of practice pass judgment on the developing skills of the novice, and at some point they decide that those skills are developed enough to allow the novice full entry to the community. An example will illustrate the above point: an apprentice who has never sanded a piece of wood will not know the quality of work expected of him. Someone with expertise will not only give him the knowledge behind the science or art of sanding; for instance, that in sanding you don't go against the grain of the wood, but in addition, it might also involve showing him how to sand a piece of wood as well as showing him a properly finished sanded piece of wood.

Our purpose in part of the discussion is to show the common pattern that points to the fact of how each one of the apprentices has appropriated the skill of making furniture. The

apprentices own words will shed light on the processes that have taken place.

The first pointer takes us to the master craft person (boss). He is important because in his assessment, he is able to know whether learning has taken place. Through supervision, checking the quality of work, he can notice the mistakes or the improvements that are made by workers especially the novices.

Participants A: Generally, all the novices will tell whether they are making progress or not firstly from the comments of the master crafts person. And secondly, they can tell that they are making progress or not because they have the capacity to progressively judge their own work and of others. The examples that follow will illustrate especially these second point mentioned above. **Participants A** could tell that he was able to "see a skewed piece of wood from far". **Participants B** said that "through every day practice he [was] able to drill holes without measuring, and drilling became part of him". P**articipants C** said that he was "now able to measure without using a tape measure". **Participants D** mentioned that is now able to see mistakes in a chair from far", this imply that he has consolidated and integrated experience and knowledge of the furniture factory. **Participants E** indicated that he had "acquired a good eye for furniture (by this he meant he could recognise mistakes in a piece of furniture). **Participants F** said he was "now able to cut and join the chair from beginning till the end of the production process; he was also "able to notice mistakes from joining a chair or stitching of a couch", and in addition, "he [could] "even tell if the material [was of] "quality or not". **Participants G** said he could "rout correctly with no mistakes, [and] "his posture [when using the routing machine] became better over time, and he [also] developed a skill of seeing if a piece of wood is routed correctly or not". **Participants H** said he was "now able to paint neatly and [in addition he could] "tell the difference between cheap paint and expensive paint.

Participants I said he was "now able to notice mistakes from a sanded piece of wood and rectify them easily".

From the above extracts it is evident that through practice and through trials and errors, but also through instruction a novice moves gradually from being a learner to become a teacher in sense that he developed a good eye for noticing poor workmanship that he was unable to notice at the beginning when he entered the field. It is this transition from unskilled to skilled that demonstrates that learning has taken place because he now knows the difference between

shoddy work and excellent work, and can also pass this judgement on other work. This makes him an expert and consequently on the basis of his skills he is admitted as a full member into the community of practice. In other words, now that he is an expert, he is no longer a novice.

From being a novice, the apprentice eventually becomes an expert. Expert knowledge involves mastery of a skill over a period sometimes to the extent that you become a reference point. In addition, this might involve the experience of working in a particular field and acquiring the tacit skill of seeing things that are not visible to the eyes of a novice worker or even other experts. Tacit knowledge is therefore the type of knowledge that is embedded in the mind of an expert which drives him/ her to make judgements on the spur of the moment that solve a problem. This knowledge is not teachable, it cannot be written on papers, which makes it difficult for an expert person to articulate it to novices, however through direct guided practices, imitation, practical observation it can be successfully transmitted. In this connection, Hurst (2010:25) observes that since "tacit is connected to the senses, personal experience, and body language, the transfer of such knowledge requires close proximity while work is being done". An example taken from participant D will illuminate this point. He was demonstrating grinding for the very first time he did not attempt any sort of description, simply saying, "You've just got to …" and then demonstrating the skill. When participants F asked him how he knew that he was putting the blade on the stone at the correct angle, he floundered for words said, "You just feel it." This is an examples of tacit knowledge and the skills that is acquired at furniture factory, through practice workers can easily use their senses, such as hands for touching in order to feel the smoothness of a piece of wood, as well as having a good eye for a piece of furniture to tell whether it has been sand properly or not. I also find this example intellectual rich.

For Hurst (2010), this involves face-to-face interaction which she recommends as crucial in order to capture a full range of sensations and reactions that are necessary for transferring tacit knowledge. For the most part, people describe what they know through words, but interactions also include body language which also constitutes the acquisition of tacit knowledge. Woods (2009:120) adds to this discourse that in order to bridge the gap between expert and novices, "the novice must engage in reflective imitation, where they copy the expert whilst reflecting on the feedback from their own actions"

The examples that follow reveal that most workers learnt by observing their more

experienced colleagues demonstrating how a specific piece of work is done. The novice in turn imitated what they saw and put it to practice. Thus:

Participant A: "When I came here, there was no written curriculum or even a list of skills or tasks that had to be learnt. There were no written plans or procedures learning was from practice. There were no formal tests or assessment, neither was there any requirement to attend school. We had to learn through observation each day".

Participant B: "I started learning as I was doing watching my boss doing it and doing after him…. it took me at least a month or so to learn".

Participant C: 'I was not given training and had to learn through observation and by imitating the boss demonstrating he said".

Participant D: "I had to look and imitate my boss each time he is showing me how to cut and how to use a machine. It becomes very difficult for me to adapt since I did not have any work experience in woodwork".

It is evident from the pointers above that tacit knowledge is being tapped into by the apprentice working with woodwork. It is the case that learning to make furniture is not necessarily acquired through theory but rather through practice; moreover, the workers are assessed at their pace and performance, namely, speed of cutting, drilling and assembling. This is underlined by **Participant C:** He observes: I have developed a skill that I cannot explain to anyone I do not know how I do it but I don't measure using a tape anymore, I use my mind and eyes to measure.

Moll et al (2005) "explains that in woodwork you cannot write or even talk about the important things very easily. You feel good furniture when you make it — you don't write. When someone learns to make furniture, the most important things you learn is not what you are told but what you learn by watching other people do."

Kreiner (cited in Foos, 2006) adds that tacit knowledge is the antithesis of explicit knowledge, in that it is not easily codified and transferred by more conventional mechanisms, such as documents, blueprints and procedures. Tacit knowledge is derived from personal experience. "It is subjective and difficult to formalise (Nonaka et al, 2000) therefore, tacit knowledge is often learned via shared and collaborative experience (Nonaka and Takeuchi,

1995) learning knowledge that is tacit in nature requires participation and doing". Because, of the personal nature of tacit knowledge, (Roberts cited in Foos, 2006:8) suggest that an important factor in this process is trust. He contends that the level of risk and uncertainty that are associated with the transfer of tacit knowledge are reduced through trusting relationships.

For the sake of emphasis, how is the apprentice assessed? According to Seiborger and Mackintosh (1998:5) to assess is to measure something. It is used in other fields not only in education and to confirm its use in different fields; Seiborger and Mackintosh (1998) argue that, for one to understand assessment, he/she has to look at what an assessor does. They give examples of an insurance assessor who is someone who estimates the value of something that has been stolen or damaged while a tax assessor, they claim he/she calculates how much someone has to pay for tax. This is an indication that assessment is not only used in education but there is a difference between assessment in education and the one that is used in other fields.

Let us shift our attention to performance based assessment. According to Walklin (1991:131) it involves workers demonstrating competence when working. Therefore, assessment in a work place means collection and evaluating of evidence on the performance of an individual against agreed objectives and criteria, carried out within work premises. In this connection, following from the data, assessment is mainly informal and through supervision from the boss who is the master crafts person. He supervises the workers to make sure that they are doing their job properly, and also customers get quality furniture. Most workers learn how to effectively use their bodies and senses by observing their boss demonstrating to them what they should do. "You see work going on around you, you see people making small, small mistakes and you learn from that" the master craftsperson said, workers learn through guided practice from master crafts person or any other skilled worker coaching or physically directing their movement. It is also evident that they learn through trial and error, adjusting their stances and motion via the visual and tactile feedback they get from tool and wood. 'I conduct informal assessment because I want o see the pace of my workers so that I can place them according to their ability, and pace especially when using a particular machine,' said the boss.

However feedback from the boss can be positive or negative, for positive feedback the boss will give extra money for the person who did a good job especial when a customer has brought his /her own design in the factory. Positive feedback encourages workers to work

even harder. Walklin (1991:159.), says that feedback given in a thoughtless manner is unhelpful. It is often the case that individual will know when they have not done well, most times there is no need to tell them since they will most certainly resent being at the sharp end of an assessor's tongue. The behaviourist's theory agrees with the appropriate use of punishments and rewards to influence behaviour. For emphasis sake, it should help the apprentice learn and become better at what he/she does. The following examples it seems to me were uncalled for. 'Participant D was very hurt when the boss smashed the chair and told him to pay for the waste material'. Participant A was shouted at and being withheld lunch times.' This we also found from participant G in his experience that he used to be given smacks and be lifted up with pants by the boss. There was a time where he wanted to quit his work. 'I heard was him grabbing my pants and lifting me up, see I was a young boy, short and very tinny, then he said what bullshit! Have you done here? (pointing at the chair), he put me down and gave a hot smack on my face, I tried to explain and I was even stuttering he did not what to hear what I was saying, then I run to the toilet, I felt like quitting the job saying to myself even my father never smacked me like that', claimed participant G.

In the table that follows, the researcher has drawn out salient comments from the personal histories data that illustrate the various stages through which the novice learners go as they move from "legitimate peripheral participation" to becoming a fully-fledged member of the community of practice.

Table 1: Summary of evidence from personal histories that illustrates various points in the movement from novice to expert in furniture making

Themes	Participant The Boss	Participant A	Participant B	Participant C	Participant D
Encountered	Vicarious learning at home -father & grandfather made & sold furniture. Taught to cut wood at 10.	Learning from 8. Father taught him to make furniture. Started doing small tasks (part of big one). Collected pieces of wood, learned names of the machines.	Learning started at factory Observation, learning each machine, learning to cut, pack timber, etc. Learnt from experienced colleagues.	Started with small jobs from day 1. Experimented with different machines, e.g. crosscutter. Painting wood, etc. Taught by boss & colleagues.	Began at carpentry training centre -std 6, then employed at factory. Started as salesman. Allowed him to assist in factory when busy.
Experienced	Learning a struggle. To get anything correct did a thing many times until perfect, e.g. rip saw to cut wood. Grandfather more experienced than father, noticed mistakes from far, shouted & swore at him.	Learning difficult for him. Trials and error - required lots of practice. Able to learn and master skills. e.g. use of stapling gun. Father shouted & punished him for mistakes. At factory, boss & colleagues assisted.	Arrived at factory -no woodwork experience. Slow and scared of machines. Through guidance from boss, became better. Remembers struggling to get things right – "kept trying hard".	No experience, learned through observation, imitating the boss. Boss was strict – if not right first time, embarrassed him in front of colleagues. Led to rectifying mistakes quickly.	Because knew designs, easier to learn machines & assembly – 1st experience assembling chair. Observed experienced colleagues demonstrating machines.

Mediation	Father & grandfather, taught him informally & practically -aim for him to acquire skills to take over business. Also went to trade school-formal learning; tests and examinations.	Learning informal at home, father taught him to make furniture using hand tools. Would "hold his hand" while cutting wood. At factory, taught by experienced colleagues, and observation & practice.	Novice in woodwork taught by the boss. Observed & imitated the boss "boss taught us according to our pace". Experienced colleagues also helped.	No training, had to learn through observation, imitation and practice every day. More experienced colleagues assisted if he needed help.	Formally trained at a training centre obtained a certificate for carpentry. When employed at factory, informal training -observation, imitation, demonstration by experienced colleagues. Believes he acquired more skills on the job than at training centre.
Internalised	All the criticisms he got from his father, he took and always rectified his mistakes, e.g., cutting a piece of wood skew, father shouted, said to himself "I'm not making that mistake again", and thought about avoiding cutting skew.	Had never found cutting difficult – had prior knowledge using knife & scissors. Assumed that cutting wood simple, but found he was wrong. Realised to cut properly needs skill & practice.	With bakery background, thought factories the same. But furniture factory different – e.g. learning to drills needed him to master measurement. Only learned this over time.	Enjoyed maths at school. Had to learn to apply it in woodwork. e.g. "measurement [must] be accurate in terms of the amount of ... wood needed for joining". He has developed this skill over time.	Having theory from training centre not enough to make furniture, however learning by doing is something he never forgets because he does it every day.

Consolidation	On basis of daily supervision, came to see for himself mistakes & monitor the whole production process. Informal assessment was backed up by reward (sweets) and punishment (hidings) from father. Formal assessment it was at the technical college through tests, exams.	Now able to see any skewed piece of wood from far. Able to tell type of wood, whether weak or strong. Does not use templates when cutting wood; he" just knows" size by looking at it. Constant informal assessment brought him to this point. No formal assessment.	Through practice every day now an expert – can drill holes accurately without measuring. Drills more that 50 tables and chairs each day. "Drilling became part of me." Constant informal assessment brought him to this point. No formal assessment.	Developed skill "that I cannot explain ... I do not know how I do it but I don't measure using a tape anymore, I use my mind and eyes to measure". Constant informal assessment brought him to this point. No formal assessment	Can see mistakes in a chair "from far". Consolidated integrated experience and knowledge of the furniture. Constant informal assessment brought him to this point. No formal assessment

Table 2: Summary of evidence from personal histories that illustrates various points in the movement from novice to expert in furniture making.

Themes	Participant E	Participant F	Participant G	Participant h	Participant I
Encountered	Started work as delivery boy in factory. Learned through demonstration and practice (learning by doing). Given informal training; imitation of boss.	Studied carpentry at technical college. Worked at factory 7 years. Started with minor tasks -sand papering, painting. Observation of colleagues "who were really good".	No previous experience in woodwork Started work as cleaner - observed colleagues on the job. The boss integrated him in production – started demonstrating tools.	Carpentry school for 6 months, certificate. "Real learning" when employed at the factory. Started with sand papering. Lots of observation of boss & other colleagues.	"No clue" about woodwork when he started. Assisted with joinery (gluing) of tables and chairs. Learned on the job, observing and following demonstrations on different machines.

Experienced	Informal training. Imitation of use of machines. “Difficult for me to adapt”, because no experience. e.g. loading & stacking timber. Improved through practice.	Learning was not easy “thought painting was the easiest thing ... but I thought wrong after my boss taught me how to paint neatly without leaving finger prints”. Over time develops skill of seeing such mistakes.	Struggled initially to cope. e.g. a mistake measuring cloth for a chair, “I thought my boss didn’t notice ... the only thing I had was a smack. I realised that my boss has a good eye to pick up wrong things”.	Theoretical knowledge not sufficient to help learn routing. Experienced colleague taught him routing, via imitation. “I did not understand ... until he explained... the way I was standing that contributed in failing to rout.”	At first difficult -no idea about the job. Being around experienced people assisted him anytime he needed help.

Mediation	Boss demonstrated cutting & joining wood. Learning informal depending on ability on various tasks his able to do better than other tasks.	Demonstration of machines, then initial practice on them. Over time, specialization on particular tasks for which he showed aptitude: painting.	Main mentor was boss – also form experienced colleagues. "I learnt through face-to face interaction ...& through practice every day".	Routing taught by experienced colleague. Learning on the job trough guidance and supervision.	Guidance from colleagues when he needed help. Learning by watching and doing after demonstration – "everyday practice".
Internalised	Offloading he thought should not be difficult. But came to realise that with timber one has to pack it in a balanced manner (big to small) so it doesn't fall.	For him practical experience, not formal study, was how he acquired most of his skill at the factory.	Thought that working with wood will not be difficult, but learned that with wood one needs to focus and practice every day.	e.g. Thought that working on wood would not be difficult, only to discover that routing required a lot of focus seeing that the machine is dangerous.	Assisted with joinery of tables and chairs using glue. Later he acquired the skill of joining chairs and tables by himself, accurately and faster.

Consolidation	Acquired "a good eye" for furniture. Constant informal assessment brought him to this point. No formal assessment	As times went on, became "very good with cutting and joining" – the ability to make a whole chair from beginning till end of the production process. It became part of me ... [I could] notice a mistake on the stitching of a chair or a couch, if it will last long or not, as well as the material itself, if it quality or not". Constant informal assessment brought him to this point. No formal assessment. Talks of promotions as a sign of positive assessment.	Posture became better when routing. "I can tell if a piece of wood is routed correctly or not, the edges will not be the same. In most cases it is the person's position that will determine the correct edges in the piece of wood". Constant informal assessment brought him to this point. No formal assessment	Painting became part of him as he was able to distinguish cheap paint and expensive paint, and if whether a piece of furniture was painted correctly or not, as well as the neatness, that is there is not figure print left in piece of furniture. Constant informal assessment brought him to this point. No formal assessment	Sanding "became part of me" - able to notice mistakes from far and rectify them easily. Constant informal assessment brought him to this point. No formal assessment.

5.2 Conclusion

The conclusion of this data analysis chapter is drawn from the summary tables of the personal history data collected on each of the categories of learning, as they describe the worker becoming a member of the expert community of practice: *encounter, experience, mediation, internalisation* and *consolidation*. It is supported by the Wenger's (1998) theory as a source of analysis to find a common pattern among the workers' learning experiences as well as in acquiring the tacit skill in the factory furniture.

5.2.1 Encountered

The common pattern that we find is that most workers started making furniture at an early age, and they were taught by the parents and some were taught by skilled workers, during the encountering stage they were doing small tasks, collecting pieces of wood, learning to cut, painting, acting as salesman, etc. They were demonstrated how to perform the task, they did a lot of observation, they also had to imitate the boss or other mentor. This shows that at their early stage of learning to make furniture they were taught minor tasks, and as they practiced and observed they learnt bigger things.

5.2.2 Experience

It is evident from the data that most workers experienced ongoing difficulties during the learning process. They struggled to grasp tasks at the beginning; however through practice they became much better. They struggled to cut a piece of wood, stapling gun, painting, the boss was very harsh as some came to the factory with no experience and it became very hard for them to adapt. Some went to trade school -however, they said that it felt as if they knew nothing when they came to the factory because at the trade school they did mostly theoretical studies. This shows that learning was not very easy for most of the workers as they experienced a lot of mistakes at the beginning, which they learnt from.

5.2.3 Mediation

Learning happened through an apprenticeship process involving demonstration, face-to-face learning, imitation as well as practice. Learning and training was very informal at the factory as the workers did not have manuals to learn from, they had to learn by observing a master craft person demonstrating to them, some had to observe their fathers, grandfathers, as well as more skilled colleagues. The workers who went in to a trade school or technical school claimed that they acquired more knowledge at the factory rather than the trade school through

guided practice and support from their boss and colleagues.

5.2.4 Internalization

Through all the trials and errors experienced by most workers during their learning journey, they acquired numerous skills. They learned from mistakes as they made a piece or furniture, and were then able to rectify them easily. Through practice every day, they developed skills of fixing any problem with regards to making furniture at ease. They did not necessarily need to ask the master craftsperson -if there is any problem they were able to help each to overcome it before the boss found out about it, they were able to share ideas amongst themselves about how to use a machine better or how to decorate a piece of wood better.

5.2.5 Consolidation

The data shows that over a certain period and through many years of experience, most workers have developed the skills of mastery in making furniture. As workers, they are able to see if a piece of wood is not manufactured correctly, or if the cut edges are skewed and what could have been the problem, or if the fabric used for covering the chair is not good enough, or when the table sanding is not done properly. This shows that through practice it is then possible to consolidate judgements about any piece of work.

Chapter 6

Discussion, Implications and Conclusions

This chapter is concerned with the research findings concerning what personal histories of workplace learning reveals about assessment practices in vocation education and training. Conclusions are made which will sum up all the main aspect of this research, recommendations are discussed with regards to further research, as well as the limitations of the study.

This study represents the SAQA's current research programme which aims at collecting various evidence form different vocational workplaces in order to understand the constitution and development of assessment expertise found in workplaces, focusing mainly in vocational context. In the first chapter the report, represent aims which focuses on the ways in which we need to re-think about assessment that takes places in different vocational workplaces as this might assist in setting up the NQF in a way that will provides and present a clear national standard which recognize learning achievement outside formal institutions. The objective of the study shows the gap of recognition between informal and formal learning that takes place in schools, and vocational education. The main problem here is that the formal education receives more recognition than the informal education yet these types of learning is needed in workplaces. The first part of the research aimed to discover the basis of assessment expertise in communities of practice in vocational contexts

In the second paragraph which is the literature review. The researcher mentioned various issues pertaining how individual become skilled, which we looked at tacit and explicit knowledge, and various theorist were mentioned. In this section we find that most theorist/references seem to be in agreement about the notion of tacit knowledge, and how it is acquired. It is said by most theorist that tacit knowledge is gained through everyday practices and engagement with a tool and also the period of time which gives a person experience to make judgement in that particular field. Theory of mediation was also motioned in detailed in relation to how an individual learn, also theory of situated cognition as well as assessment.

The chapter following is the methodology chapter, the research method employed a qualitative approach with an aspect of ethnographic case study of a particular sample of male workers in furniture factory.

The data present the following key findings, which are drawn form figure 1 which discusses the stages of learning, and describes the process of learning, and experience for each worker in acquiring the tacit knowledge in the furniture factory. The following stages are drawn from figure1. *Encounter*, the data shows that for most workers learning started at an early stage, in this stage most workers were doing minor tasks, helping were they were asked to do so, they were observing and imitation. *Experience*, most workers did not have much experience, they had to learn by doing, through everyday practice, and imitation. *Mediation,* the data reveals that most workers were taught by their parents, fellow colleagues, and the boss. *Internalisation*, the data shows that most workers had to learn through several mistakes and lots of practice. Lastly, *Consolidation* data shows that through a certain period of time, and through practices workers developed a skill which became tacit, they were now able to tell/judge/assess when a piece of wood is not done properly.

The analysis chapter presents a detailed discussion and analysis of the data presented looking at the key findings drawn from the data itself using figure 1 which is the stages of learning taken from wenger's theory.

The data reveals that in the furniture factory they only based their learning on practical knowledge which then becomes tacit knowledge over a certain period. Most workers mentioned that they have acquired more skilled at the furniture factory, compared to the knowledge that they have learnt at the trade school of carpentry. Walklin (1991:109) has mentioned that "becoming skilled and competent can results from experience of doing things and does not necessarily depend upon the outcomes of formal instructional process". Tacit knowledge is also significant it prepares a novice to become an expert in the field, rather than having a manual which is explicit knowledge, and therefore cannot assist the worker in developing tacit skills and knowledge. However, through observation, and practice it is evident that a person is able to acquire the tacit knowledge, and it becomes second nature as the person moved from just being an observer to an instructor which enables him to make judgments on a piece of furniture made.

The data from the furniture factory shows that tacit knowledge is not easily transferred to novice; it is transferred through observation, imitation and practice. Most workers in woodwork especially newcomers become experts through observation and practice especially if they have been doing woodwork for some time and this becomes second nature to them. The master crafts person said that: "Through experience it becomes second nature" one of the staff who's been to the business for 43 years now, as he is the one guy who's been to the business for such a long time than the others, so he is highly experienced about the business. Every young and new worker look up to him because of his experience, they trust him, and always ask him for any help. It is evident that knowledge is deepened or transferred through face-to-face contacts, observation and practice of a particular skill. As a result of such interactions learners (novices) and teachers (experts) have reported that the most rewarding and meaningful learning experiences are one on one.

The research suggests the need for the NQF to merge education and training by setting up criteria on its unit standards and assessments which intend to which integrates and gives recognition to the two types of forms of knowledge namely, explicit and tacit knowledge as these knowledge is very crucial in recognising skill that is found in vocational training centres and workplaces. Tacit knowledge should gain the same value as explicit knowledge in terms of assessment for skills and qualification in the NQF.

At this stage I am unable to draw numerous conclusions for this research, as it still on the developmental stage, there still more time needed for collecting data in various vocational workplaces, which might assist in understanding the constitution and development of assessment expertise in communities of practice in vocational contexts.

6.1. Limitations of this study

The study used a limited number of novices and experts, therefore the study cannot be applicable to the general public, and the research was also conducted in one specific factory furniture which also minimized the collection of data.
The data was collected during the participants working hours, this also added to the reason of the data being limited.

Workers were reluctant to disclose some of the questions that were asked during the informal and formal interview even though they were given assured about the nature of confidentiality of the study (*see appendices*).

Since it was a workplace, factory furniture, plus it was noisy I struggle to communicate to workers, interview them as the employees felt I was delaying the production process, and the lunch times were not enough. Shortly they did not have much time to talk while working.
I started by using structure/formal questions for the interview and due to time constrains I ended up using unstructured interviews

It is evident from the findings that during the data collection, the researcher did not get sufficient information; this is because of the time period given for the completion of this particular research.

Ethnographers should spend a period of at least six month or long so that he/she can be able to get valuable information, I feel that the time that I spend at the field was not enough in giving reach and valuable information to make conclusions.

6.2. Recommendations for further study

The following research areas with regards to this study are suggested: Further, research can be conducted using three or more different factory, as it will show similarities and differences concerning the workers learning/skill acquisition histories in the vocational workplace. This might make the data more rich, and a valuable source when analysing, and writing the findings.
The ratio or sample of participants must be equal in terms of the worker who has more knowledge (experts) and those that has less knowledge (novice) so that it does not become bias to the general public. In other words future researchers need to pay attention on balancing the number of workers who are more knowledgeable with the less knowledgeable.

If the researcher is using ethnography as methods of collecting data then it should be given more time approximately six months to twelve months. This will assist the researcher to fully participate and observe in that community of practice, to get a depth understanding of the activities that those people are involved daily, (To find rich and valuable information).
Given the fact that factories are busy places, and workers are expected to complete their task in a certain speed that would not affect the production process, I recommend the use of focus group as a method of collecting data. Du Plooy (2009:199) has mentioned that focus group provides data that are rich in ideas and provides opinions and attitudes from the subjects' point of view.

REFERENCE LIST:

Airasian, P. W. & Walsh, M. E. (1997). Constructivist cautions. *Phi Delta Kappan*, 78, 444-452. (Downloaded 30th August 2009, from Academic Search Premier.

Allais, S. (2007). The Rise and fall of the NQF. Thesis for Doctor of Philosophy. University of the Witwatersrand.

Best, J.S & Kahn, J.V. (2006) *Research In Education* 10th Ed: Pearson education Inc; New York.

Biggs, J. B. & Collis, K.F. (1982). *Evaluating the Quality of Learning: The SOLO Taxonomy.* New York: Academic Press.

Blumentitt, R. & Johnston, R. (1999). Towards a strategy for knowledge management *Technology Analysis & Strategic Management* 11, 287-300. (Downloaded on the 18th of September 2010). http://www.theorsociety.com/about/topic/projects/kmwebfiles/explicit_and_tacit.htm.

Brewer, J.D. (2000). *Ethnography, Understanding Social Research*: London.

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

Callahan, S. (2000). Want to Manage Tacit Knowledge? Communities of Practice Offer a Versatile Solution. Anecdote. Complexity. Narrative. Knowledge.www.anecdote.com.au/papers/Want_to_manage_**tacit_knowledg e**.pdf. (Downloaded on the 22nd September 2010).

Creswell, J.W (1994) *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks: Sage Publication.

Crook, C. (1994). "Human Cognition as socially grounded" *Computers and the Collaborative Experience of Learning.* (pp. 30-51)**.** London: Routledge.

Crowley, E. (1994) 'Using Qualitative Methods in Special Education Research'. *Exceptionality* 5(2), pp 55-59.

Davis, B. (2004). *Inventions of Teaching: a Genealogy*. Mahwah, NJ: Lawrence Erlbaum Associates.

Disterer, G. (2001) *Individual and Social Barrier to Knowledge Transfer*. London: Rutledge.

Donald, D., Lazarus, S. & Lolwana, P. (1997). *Educational Psychology in Social Context.* Cape Town: Oxford University Press.

Du Plooy, G.M. (2009). Communication Research, *Techniques, Methods and Applications,* 2nd edition. : Cape Town .

Ely, M., Anzul, M., Friendman, T., Garner, D. & Steinmetz, A. M. (1991). *Doing Qualitative Research: Circle within Circles.* New York: The Falmer Press.

Fetterman, D. M. (1998). *Ethnography* (2nd Ed) Step by Step. (Vol. 17). Thousand Oaks: Sage Publications.

Foos, T. Schum, G. Rothenberg, S. (2006) 'Tacit Knowledge Transfer and the Knowledge Disconnect'. *Journal of Knowledge Management* Vol 10. 1 2006: 618.

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

Gorman, ME. (2002) Types of Knowledge and Their Roles in Technology Transfer*, Journal of Technology Transfer;* Jun 2002; 27, 3; pg. 219. *Kluwer Academic Publishers. Manufactured in The Netherlands.*ABI/INFORM Global. Downloaded 17 September2010.
http://www.springerlink.com/content/q4kn76m9tu3fvwyl/fulltext.pdf

Gorman,G. & Clayton, P (1997). *Qualitative Research for the Information Professional: A Practical Handbook*. London: Library Association Publishing.

Hammersly, M. (1993). *Social Research; Philosophy, Politics and Practice.* London: Sage Publications.

Hatano, G. (1996) A Conception of Knowledge Acquisition and Its Implications for Mathematics Education. In P. Steffe, P. Nesher, P. Cobb, G. Goldin and B. Greer (Eds), *Theories of Mathematical Learning*. New Jersey: Lawrence Erlbaum

Hedegaard, M. (1990). The zone of proximal development as basis for instruction. In L. Moll (Ed.), *Vygotsky and Education*. Cambridge: Cambridge University Press.

Hittleman, D & Simon, J. (1997) Interpreting educational research; *An Introduction for Consumers of Research.* New Jersey: Prentice Hall.

HSRC. (1995, Oct). *Ways of Seeing the National Qualification Framework*: Pretoria

Hurst, L.R. (2010). Identifying Tacit Knowledge Used By Secondary School Teachers: The University of Toledo. http://www.sims.berkeley.edu/~vanhouse/bridge.html, (Downloaded on 22 September 2010).

Huysamen, G. (1994). Methodology for the Social and Behavioural Sciences. Johannesburg: *International Thompson Publishing* (Southern Africa) (Pty) Ltd.

Jessor, R. Colby, A. & Shweder, R. A (1996) *Ethnography and Human development; sub-context and meaning in social inquiry;* London: University of Chicago Press.

Killen, R. (2003). "Validity in Outcomes-base assessment" Perspective *in Education.* 21(1), 1-14.

Klein, G. (1998), *Sources of Power*: MIT Press.
www.cs.berkeley.edu/~jheer/ubicomp/Seeing%20the%20Invisible.doc.
Downloaded on the 10th June 2010.

Laurillard. D. (2002). *Rethinking University Teaching*. London: Routledge (Chapter 1 & 3).

Levine, M and Teasley, S. D (Eds), *Perspectives on Socially Shared Cognition* Washington, DC: American Psychological Association (pp. 63-82).

Lave, J. (1996a). The practice of learning. In Chiaklin, S. and Lave, J. (Eds) *Understanding Practice: Perspectives on Activity in Context* (pp. 3-31). Cambridge: Cambridge University Press.

Lave, J. (1996b). "Teaching, as learning, in practice" *Mind Culture and Activity*, 3, 3, pp. 149-163.

Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.

Lave, J. & Wenger, E. (1999). Legitimate peripheral participation in communities of practice. In R. McCormick and C. Paechter (Eds), *Learning and Knowledge.* London: Paul Chapman and the Open University.

Mackay, Y. & Schuh, J. (1991). 'Practical Issues Associated With Qualitative Research Methods'. *Journal of College Student development*, 32(5), pp 424-432.

Magnus, J. Morgan, M. (Eds). (1999). Methodology and Tacit knowledge: Two experiments in econometric Wiley Chichester.

Marsh, C. (1997). *Perspectives; Key Concepts for Understanding Curriculum*. London: Falmer Press.

Marti, E. (1996). Mechanisms of internalisation and externalisation of knowledge in Piaget's and Vygotsky's theories. In Tryphon, a. & Voneche, J.J. (Eds). *Piaget-Vygotsky. The social genesis of thought.* Hove: Psychology Press.

Mason, J. (1996). *Qualitative Researching*: London: Sage Publication.

McCormick, R. & Paechter, P. (1999). *Learning and Knowledge*. The Open University, London.

Miller, R. (1989). 'Conceptual Issues in Theorizing About Cognition'. *South African Journal of Higher Education*, 3, 1, 154-159.

Mngqolo, S. (2002). Oral history -an educational tool for educators and learners – Source: Unpublished material from 3 Provincial History Conferences, December 2002, supplied by Claire Dyer, SA History Project, and National Dept. of Education. http://www.sahistory.org.za/pages/people/bios/badela_m.htm (Downloaded from SA History Online on 10 June 2009).

Moll, I. (2004). Why Piaget and Vygotsky? Chapter 2 in "Internalisation" in Piaget and Vygotsky: *the question of the synthesis of the two theoretical traditions and its implication for the analysis of school learning*. Unpublished Doctoral Thesis. Johannesburg: University of the Witwatersrand.

Moll, I. (2002). 'Clarifying Constructivism in a Context Of Curriculum Change'. *Journal of Education*. 27, pp. 5-32.

Moll, I. (2002). 'Clarifying Constructivism', *Journal of Education,* 27, pp 5-32.

Moll, I. (2009). *Transparency and Specification: thought occasioned by reading Allais' The Rise and Fall of the NQF*. A paper presented on the 24th Feb at the school of education: University of the Witwatersrand.

Moll, I. (2009*). Understanding Learning, Assessment and the Quality of Judgments.* A paper presented on the 24th Feb at the school of education: University of the Witwatersrand.

Moll, I., Steinberg, C. & Broekmann, I. (2005). *Being a Vocational Educator: A guide for lecturers in FET colleges*. South African Institute for Distance Education (SAIDE): South Africa.

Mosessinger, P. (1978). 'Piaget on Equilibration'. *Human Development*, 21, pp. 225-257.

Mouton, J. & Marias, H. (1994). *Basic Concepts in the Methodology of Social Sciences*. Pretoria: HSRC publishers.

Mouton, J. (1996). Understanding Social Research. Pretoria: J.L van Schaik.

Murphy, P. & Hall, K. (2008). Learning and Practice; Agency and Identities. London: The Open University.

Murphy, P. & McCormick, P. (2008). Knowledge and Practice, Representations and Identities: Sage Publication.

Neuman, W.L. (2003). Social Research Methods, *Qualitative and Quantitative Approaches,* Whitewater: University of Wisconsin.

Newman, W. (1997). Social Research Method; Qualitative and Quantitative Approaches (3 edition). Boston: Allyn and Bacon.

Nonaka, I., Toyama, R. & Konno, N. (2000). SECI, Ba and Leadership: a Unified Model of Dynamic Knowledge Creation. *Long Range Planning*, 33(1), pp 5-34.

Nonaka, I. &Takeuchi, M. (1995). *The Knowledge Creating Company – How Japaness Companies Create the Dynamics of Innovation* Oxford: The Oxford University Press. (Downloaded on the 18th of September 2010) http://www.theorsociety.com/about/topic/projects/kmwebfiles/explicit_and_tacit.htm.

Pahad, M. (1997) *Assessment and the National Qualification Framework: A Guide for Teachers*. Santon; Heinemann Higher and Further Education.

Pan S. L. and Scarbrough, H. (1999). Knowledge Management in Practice: An Exploratory Case Study of Buckman Labs *Technology Analysis and Strategic Management* **11**(3) 359-74. (Downloaded on the 18th of September 2010) http://www.theorsociety.com/about/topic/projects/kmwebfiles/explicit_and_tacit.htm.

Piaget, J. (1964). Developmental and Learning. In Ripple, R & Rockcastle, V. (Eds). *Piaget Rediscovered*. Ithaca: Cornell University.

Platts, M. J. & Yeung, M.B (2000). Managing learning and tacit knowledge *Strategic Change (UK)* 09 06 pp347-356. (Downloaded on the 18th of September 2010) http://www.theorsociety.com/about/topic/projects/kmwebfiles/explicit_and_tacit.htm

Polanyi, M. (1966). *The Tacit Dimension*. London: Routledge & Kegan Paul. *Practice.www.knowledgeboard.com/download/3512/Tacit-vs-Explicit*.pdf (Downloaded 9th of June 2009).

Republic of South Africa (2008). *National Qualifications Framework Bill*. As introduced in the National Assembly of Bill published in Government Gazette No. 31039. Minister of Education.

Rubin, J. & Bannie, E. (1993). *Research Methods for Social Work*. California: Brooks/Cole Publishing Company.

Schiro, M. S. (2008). *Curriculum Theory: Conflicting Visions and Enduring Concerns*. Los Angeles: Sage Publications.

Seiborger, R. & Macintosh, H. (1998). *Transforming Assessment: Guide for South African Teachers.* Kenwyn: Juta.

Siegler, R.S. (1995). Reading and developmental processes. In V. Lee and P. das Gapta (Eds) *Children's Cognitive and Language Development*. Oxford: Blackwell.

Slonimsky, L. & Shalem, Y. (2004). 'Pedagogic Responsiveness for Academic Depth'. In H. Griesel (Ed.), *Curriculum Responsiveness in Higher Education*. Pretoria: South African Universities Vice-Chancellors' Association.

Solomon, J.P. (2005). *A Framework for Sharing and Retaining Tacit Knowledge within Organisations*: University of the Witwatersrand. Johannesburg.

Spradley, J.P. (1980). *Participant Observation*. New York: Holt, Rinehart & Winston.

Spradley, J.P. (1979). *The Ethnographic interview:* United state of America

Spradley, J.P. and McCurdy D.W, (1972). *The Cultural Experience; Ethnography in complex Society*. United State of America: Waveland Press.

Taylor, S.J. & Bogdon, R. (1984). *Introduction to qualitative research methods*. New York: John Wiley & Sons

Von Glaserfeld, E. (1995). *Radical Constructivism: A way of knowing and learning*. London: Falmer Press.

Vygotsky, L.S. (1962). *Thought* and *Language.* Cambridge, MA: MIT Press

Vygotsky, L.S. (1962). *Thought* and *Language.* Cambridge, MA: MIT Press.

Vygotsky, L.S. (1978). Mind in society: The Development of Higher Psychological Processes. Cambridge, MA: Harvard University Press.

Vygotsky, L.S. (1931). Pedagogy of the adolescent, In Rieber, R. W. (Ed). *The Collected Works of L.S. Vygotsky. Volume: Child Psychology*. New York: Plenum Press, 1998.

Vygotsky, L.S. (1978). Chapter 6 in *Mind in Society*. Cambridge, MA: Harvard UP.

Wadsworth, B. J. (1996). *Piaget's theory of Cognitive and Affective Development: Foundations of Constructivism.* New York. Longman.

Walklin, L. (1991). The Assessment of performance and Competence, *A Handbook for Teachers And Trainers.* Stanley Thornes (Publishers) Ltd.

Wenger, E. (1989). *Communities of Practice: Learning, Meaning and Identity*. London: Cambridge University Press.

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

Wertsch, J. V. & Tulviste, P. (1996). L. S. Vygotsky and Contemporary Developmental Psychology. In H. Daniels (Ed.), *An Introduction to Vygotsky*. London: Routledge.

Wertsch, J. V. (1984). The Zone of Proximal Development: Some Conceptual Issues. In B. Rogoff & J. V. Wertsch (Eds.), *Children's Learning in the "Zone of Proximal Development"*. San Francisco: Jossey Bass.

Wertsch, J. V. (1991). "Socio-cultural Setting and the Zone of Proximal Development: The Problem of Text Based Realities". In L. T. Landman (Ed). *Culture, Schooling and Psychological Development* (pp. 71-86). New Jersey: Ablex.

Winch, C. (2000). Learning in the Workplace Chapter 8, *Education, Work and Social Capital*. London: Routledge.

Wood, N. (2009) A Tacit Understanding: *The Designers' role in capturing and passing on the skilled knowledge and master craftsmen*: vol 3 no 3. Sheffield Hallam University: UK. E:\Work\Hard Drive\Research report 2010\A Tacit Understanding the Designer's Role in Capturing and Passing on the Skilled Knowledge of Master Craftsmen.mht. Downloaded on the 3rd of October 2010.

Appendices

LETTER OF CONSENT

Stylish Factory Furniture

To whom it may concern

My name is Nondumiso Mnisi, a post graduate student at University of Witwatersrand, currently completing a Masters degree by coursework and research report. As a requirement of completing my qualification, I am conduction a research study on how tacit knowledge is transferred in the workplace environment through the assessment (judgement) that is made by an expert to a novice.

My research is of an aspect of ethnographic method, which requires the researcher to fully engage in participation observation, to become part of the communities of practice found in the workplace, to collect data as much as she/he can, write field notes of each event that took place daily, so as to gain a deep understanding about the function of the work place. Participants will engage in formal and informal interviews.

Therefore, the main purpose of the study is to discover what tacit knowledge or skills experts in the workplace use to assess novices, and how these skills are passed onto novices. For the requirements of the research project, participation observation, interviews and discussions will be conducted.

I kindly request time and participation of your workers, as I will be selecting key informants (experienced individuals) and novices/newcomers. The data collected from the formal and informal interview and written on field notes will be held confidential and analyzed for research purposes. All data will be destroyed after the completion of the study. The real names of participants will not be disclosed to anyone used when the interviewer record the work or analyse it.

For further information don't hesitate to e-mail me on
Nondumiso.Mnisi@students.wits.ac.za/ mnisin6@yahoo.com

Your participation will be highly appreciated

Thank you in advance.

Yours Sincerely

Nondumiso Mnisi (researcher) Professor Ian Moll (Supervisor)

Tel: 079 189 07 90 Tel: (011) 717-3194

SUBJECT INFORMATION SHEET

My name is Nondumiso Mnisi, a post graduate student at University of Witwatersrand, currently completing a Masters degree by coursework and research report. As a requirement of completing my qualification, I am conduction a research study on how tacit knowledge is transferred in the workplace environment through the assessment (judgement) that is made by an expert to a novice.

For the requirement of my research project, participation observation, interviews, and discussions will be conducted.

All the interviews and the writings will be strictly confidential. You real name will not be used when the interviewer record the work or analyse it. I will also like to inform you that since your participation is voluntary you will not receive any payment for participating in this study. There will be no personal benefit that will be gained. However, the insights gained from this study will have benefit for the South African Qualification Authority (SAQA).

I would like to inform you that this paper aims to give you a general idea of the nature of the research. However, please be free to ask for more details by communicating directly with me.

The below spaces asked for your signature to confirm that you have understood the above information concerning your participation in the research project and indicates that you agree to participate, knowing that you can withdraw your participation at any time. Again I urge u to feel free to ask question for clarity and information concerning.

Your participation will be highly appreciated

Thank you in advance. (Nondumiso Mnisi)

Name of participant Signature

Date: _____

INFORMED CONSENT FORM FOR INTERVIEWEES

I fully understand the purpose of the research, and the procedures involved. I understand that my participation in the study is voluntary and I am allowed to withdraw anytime.

I understand that my name will not appear on the interview schedule and it will not be used in the final report.

Any information I reveal to the researcher will be treated with confidentiality.

I agree to take part in the study, by answering questions during the interview

Signature of participant Date

I (Nondumiso Mnisi, 0420396D) have precisely explained the procedures and the aims of the study to the best of my ability. I have assured the participant that participation is voluntary and that he/she is allowed to withdraw anytime.

I have also guaranteed the participant that all information revealed to me will be treated with confidentiality and that his/her name will not appear on the interview schedule and will not be used in the final report.

Signature

Cell: 079 189 0790

INFORMAL INTERVIEW SCHEDULE FOR KEY INFORMANTS

1) How long have you been in this occupation?
2) Did you have previous experiences in relation to the job?
3) Describe you first day at work? How did you cope?
4) Have you ever been asked to assist the novices?
5) What was your experience when assisting the novices?
6) What do you think is the most difficult thing for novices to grasp?
7) How did you master your job?
8) Who assesses when a novice is competent enough to enter the field?

Wits School of Education

27 St Andrews Road, Parktown, Johannesburg, 2193 • Private Bag 3, Wits 2050, South Africa
Tel: +27 11 717-3007 • Fax: +27 11 717-3009 • E-mail: enquiries@educ.wits.ac.za • Website: www.wits.ac.za

Ggg

STUDENT NUMBER: 0400396

D Protocol: 2009ECE110
03 November 2009

Ms. Nondumiso Mnisi
P O Box 2363
KANYAMAZANE
1214

Dear Ms. Mnisi

Application for Ethics Clearance: Master of Education

I have a pleasure in advising you that the Ethics Committee in Education of the Faculty of Humanities, acting on behalf of the Senate has agreed to approve your application for ethics clearance submitted for your proposal entitled:

What Personal Histories of Workplace Learning reveal about Assessment Practices in Vocational Education and Training

Recommendation:

Ethics clearance is granted

Yours sincerely

M Mabeta

Matsie Mabeta
Wits School of Education

Cc Supervisor: Prof. I Moll (via email)