



UNIVERSITY OF KWAZULU-NATAL

College of Law and Management Studies

School of Management, Information Technology and Governance

Master of Commerce in Human Resources

Research Dissertation

**Customers' Perception of the quality of apprentice training provided by Transnet
School of Engineering in Durban.**

Thandukwazi Maxwell Magcaba

212560901

Supervisor: Dr Abdulla Kader

Durban

January 2018

DECLARATION

I, Thandukwazi Maxwell Magcaba, hereby declare that this project is the result of my own investigation and it has not been submitted in part or in full for any other qualification or to any other institution of higher learning. Where ideas of other people might have been used, they have been duly acknowledged.

.....

.....

LIST OF ABBREVIATIONS

SOE	School of Engineering
SETA	Sector Education and Training authority
OJT	On-Job-Training
TVET	Technical Vocational Education and Training
CBMT	Competency Based Modular Training.
TBMT	Time Based Modular Training
US	United State
CEO	Chief Executive Officer
SAQA	South African Quality Assurance
ILO	International Labour Organisation
PLC	Programmable Logic Controllers
VSD	Variable Speed Drives
CNC	Computer Numerical Control
ARPL	Artisan Recognition of Prior Learning
N1-N6	National certificate
GDP	Gross Domestic Product
DHET	Department of Higher Education and Training
ARPL	Artisan Recognition of Prior Learning

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to the following people who gave an insurmountable contribution to the successful completion of this research project:

My Supervisor Dr Kader for his unwavering mentoring and coaching during the journey, his support and motivation is above it all.

My colleagues at Transnet Engineering who were helping during the data collection, their contribution is extremely cherished.

My Wife and my kids for supporting and encouragement during the journey and instilling a courage of motivation.

DEDICATION

I dedicate this research project to:

My entire family for being a source of strength and encouraging me to always keep my eyes on the ball and not give up even when there are tough times.

.....

.....

ABSTRACT

The artisan development institutions are working in an environment that is highly turbulent which requires many stakeholders to work together for the desired results to be achieved by the whole nation. When the employers are complaining about the quality of artisans they are only pointing fingers towards the skills development institutions and not towards them as major stakeholders in the training of artisan from a point when an artisan is an apprentice till he passed trade test. The artisan development landscape needs to improve for the country economic to realize the desire benefits. One of the challenges are the weak foundational background of most of our learners and the language that artisan development is taught in. The biggest challenge the learners and tutors are faced with is changes on machines that are being utilized in the modern economy. When you visit the apprentice schools only old and some obsolete equipment that are being used to teach apprentices.

When visiting manufacturing organizations they have the latest machines fitted with latest technology as operating systems, when the artisan apply for an employment he is confronted with an equipment that he never touched and is like retraining him completely from the scratch.

Against this background the study investigates the perception of customers on the quality of artisans getting produced by the School of Engineering. Apprentice model has been identified as the best approach for the artisan training. It is a good method to build capacity for future human capital. It also provides the good perspective of the development of quality artisans. The survey questionnaire was used to collect data on this study.

The results of the research revealed that there was a need to improve technology if we want to improve the quality of our artisans. The findings revealed that the majority of the participants felt that the framework of training quality artisans was available in the School of Engineering, but there were areas of improvement as covered by the recommendations. It is important to note that Transnet School of Engineering Durban and Transnet Durban operations were used for the whole research.

Table of Contents

DECLARATION	
LIST OF ABBREVIATIONS	ii
ACKNOWLEDGEMENTS	iii
DEDICATION	iv
ABSTRACT.....	v
LIST OF TABLES	x
Chapter One: Introduction and the study background	1
1.1 Introduction and study background.....	1
1.2 Background of the Study	2
1.3 Theoretical Framework Underpinning the Study.....	4
1.3.1 Mentor Teacher/Apprentice Model.....	4
1.4 Research Problem	5
1.5 Research Questions.....	6
1.6 Research Objectives.....	7
1.7 Research Methodology: Mixed Method Research Approach	7
1.8 Study Site.....	8
1.9 Significance of the study.....	8
1.10 Justification/Rationale of the study.....	9
1.11 Ethical Consideration.....	9
1.12 Limitation of the study	10
1.13 Summary	10
Chapter Two: Literature Review	11
2.1 Introduction.....	11
2.7 Criticism of Apprenticeship Model as a complete workplace learning technique.....	18
2.8 Artisans as a catalyst of Economic Growth	19
2.9 Framework for artisans training and development.....	21

2.10 Training quality and relevant skills.....	23
2.11 Quality of Artisans and Continuous Improvement	24
2.12.1 Quality assurance of Apprentice Training in other countries	27
2.13 Conclusion	28
Chapter Three. Research Methodology	30
3.1 Introduction.....	30
3.2 Study Objectives	31
3.3 Research approach/paradigm	33
3.4 Study Site	Error! Bookmark not defined.
3.5 Target population	34
3.6 Sampling strategy.....	34
3.7 Sample size	35
3.8 Data Collection Instruments.....	36
3.8.1 Interviews.....	37
3.8.2 Survey Questionnaires	40
3.8.3 Observation	Error! Bookmark not defined.
3.9 Data Quality Control.....	40
3.9.1 Cronbach’s alpha	40
3.9.2 Reliability.....	40
3.9.3 Validity	41
3.9.4 Measurements	41
3.10 Data Analysis Methods.....	41
3.11 Ethical Considerations	42
3.12 Conclusion	43
Chapter Four: Data Analysis and Interpretation of FindingsError! Bookmark not defined.	
4.1 Introduction.....	Error! Bookmark not defined.
4.2 Participants Profile.....	44

4.2.1 Sector	44
4.2.2 Qualification of Participants	45
4.2.3 Work Experience	47
4.2.4 Gender shape of the participants	48
4.2.5 Statistical Analyses	49
4.2.6 Participants' Perception of the School of Engineering and Apprenticeship Development.....	50
4.3 The Study Interview Questions.....	53
4.3.1 Advantages of Semi-Structured Interview Questions	54
4.3.2 Disadvantages of Semi-Structured Interview Questions.....	54
4.4 In depth questionnaires	54
4.4.1 How do you see the structure of the job training for our artisan trainees?.....	54
4.4.2 What would you like the school to improve so that the quality of artisans we are producing are in line with your need as a client?.....	55
4.4.1 How do see the way we train artisan now and the time you were doing apprentice?.....	55
4.4.2 What is the challenging thing to produce the best artisan that the industry is happy to have?	55
4.5 The question that was asked from the phase 3 apprentices sampled was as follows:.....	56
4.5.1 What were factors that do you think affects the quality of the training that you are getting from School?.....	56
4.6 Common Issues to the Journey of Producing Quality Artisans by the School of Engineering: Common Issues.....	63
4.7 Summary	63
Chapter Five: Findings, Recommendation and conclusion.....	64
5.1 Introduction.....	65
5.2 The Problem, Research Questions and Objectives	65
5.3 The following Questions required answers.....	65
5.4 Observations by the Researcher.....	70
5.5. Role of Stakeholders in the Artisan Development and Observation by the Researcher	70
5.6 Recommendations.....	71
5.7 Recommendations for future Research	72

5.8 Conclusion.....	74
List of References.....	76
Annexure A.....	81
Information Sheet and Consent to Participate in Research.....	81
CONSENT TO PARTICIPATE.....	83
Additional consent, where applicable.....	83
ANNEXURE B.....	84
SECTION A.....	85
DEMOGRAPHIC DATA.....	85
SECTION B.....	85
SECTION C.....	86
PREPAREDNESS OF LEARNERS BY APPRENTICE SCHOOL.....	86
SECTION D.....	87
MULTIPLE SURVEY QUESTIONNAIRES EVALUATING THE TOPICS WITH REGARDS TO QUALITY OF ARTISANS PRODUCED BY SCHOOL OF ENGINEERING IN DURBAN.	87

LIST OF TABLES

Table 1 Apprenticeship and Youth Employment.....	17
Table 2: below illustrates the qualifications of the participants by category	45
Table 3: below illustrates data on the length of service for each category of participants.	47
Table 4: below shows the age and gender of the respondents.	48
Table 5: Percentage vs Rate recurrence	52

LIST OF FIGURES

Figure 1: The sample consisted participants from five main sectors (Apprentices, Tutors, Artisans, Supervisors and Managers).....	45
Figure 2: Years of experience as an Artisan	47
Figure 3: Age and Gender Percentage Distribution	48
Figure 4: Analysis of Responses from Participants	50

Chapter One: Introduction and the study background

1.1 Introduction and study background

This chapter introduces the whole research venture. It presents the study context, explanations and interpretation of certain concepts, problem consciousness, the reasons and study objectives and chapter dissections.

Any country's Human Resources as a major component of the main factors of production, there are basic requirements that have to be fulfilled so that the country is able to increase its productivity, better compete in various areas, mainly one which are price and quality of product being produced. This may lead us to another debated about how do we measure quality of apprentice training in our society, and there could be different aspects each individual may be attached to quality of artisan depending on his or her background, which may require a research on its own to conceptualize the meaning that is being recognized by the majority.

Like most of the countries developing or developed found themselves in the similar situation where globalization was a reality (Boone and Kurtz, 2011). For any country to compete pound to pound with the rest of the world it has to ensure that it is producing the enough and best quality of skilled personnel who will give it an added advantage on this ruthless competitive world (King and McGrath, 2002: 198). Transnet operations to ensure all the above happens they rely on the artisans that are being produced by School of Engineering.

The School of Engineering trains apprentices to become artisans so that they are able to repair and maintain the machines and equipment, which are used by Business Units to carry its daily activities. An artisan is a skilled person who undergoes a knowledge training component, practical component as well as workplace component training when completed all these types of training he/she undergoes a comprehensive test which takes more than one day in other cases it is three days when he passed he obtains a certificate called trade test of red seal (Merriam Webster, 1828). The challenge that is facing Durban operations of Transnet is that the costs of outsourced repairs in the last six months has increased tremendously. The cause is attributed to the failure of artisans to repair and maintain machines to right level within the acceptable time

allocated. This is costing operations since the availability of machines and equipment affects the delivery of services to their clients. **The** Plant and Equipment maintenance department is blaming School of Engineering for producing poor quality of artisans that cannot do the job. The study will look at the way in which artisans are trained within the framework of apprentice training model so that a real cause may be identify for the right remedy to be investigated and sort.

1.2 Background of the Study

One of the Transnet Operations in Durban is involved in refurbishment and manufacturing of wheels, locomotives, wagons, coaches that are being used by Rail Industry in Transportation of different goods and products to various areas of the country and other parts of the world using rail networks. The process involves a number of heavy machinery and equipment, which acts as input to the output of this plant. In other sections 24/7 shifts are working which render maintenance to the machines so that they are able to push production nonstop. This operation is employing 1 400 employees both management and bargaining unit. The budget per year is over 3 billion rand. The employees whose work is to repair and maintain machines and equipment's of the organization are coming from School of Engineering in their Durban campus. School of Engineering is a Transnet school that is specializing on the training and development of artisans. Artisan is a person who has undergone the training in an accredited training Centre in terms of the requirements of Skills Development Act (Merriam Webster, 1828).

This person is taught theory and practical how to use his/her hands to solve practical problems in the world of work. The livelihood of the organization is dependent on whether the School of Engineering produces enough and good quality of artisans at the end of the apprentice period. When the school may not produce the right quality the whole organization's future is hanging in the balance. These employees undergo a 3 year training program as apprentices, which is 60% institutionalized and 40% on the job. Transnet's major operations is Transportation of goods whether dry or liquids that tells us it is a major player in the South African economy because its operate pipelines that transport major economic commodity which is fuel, they also play a major role on the transportation of coal which is the major input to the generation of

energy in our country since it is used on electricity generation and generate major export income as our export are mainly relying on our natural resources at the moment.

These artisans coming from School of Engineering are tasked with major job to ensure that the repairs and maintenance on the equipment is always at the right level. Transnet bought new fleet of equipment which came with new technology. At the moment there is a big challenge the availability of the equipment is below 80% which is causing a lot of delays on the transportation of goods and products. The OEM is permanently in our operations fixing the faults on these new equipment, this is causing high cost of doing business because all their costs are carried by Transnet, this affects profitability margins as well.

Everybody is blaming bad quality of artisans that are being produced by Transnet school of Engineering Durban campus as the major cause of this problem. Everybody is frustrated hence this study is important as it may influence the way things are done. The School of Engineering have 392 learners, 19 lecturers, 1 administrator, and 1 campus manager. The ratio of lecturer to learner is 1:21. South African law does not prescribe the number of learners per lecturer in the TVET level. This area has been left to the quality assurance bodies of the apprentice governing authorities like SETAs (Sector Education and Training Authorities). This type of training requires that there are machines for practical component as well as On Job Training (OJT). During OJT the learner is partnered with an experienced artisan whom used to be called journeyman during the old craftsmen period. The experienced artisan play a major role on the learning of real skill by the learners, when the environment for learners to learn here is not conducive the learners will come out raw on the skills will always depend on someone they do not gain confidence to work independently.

This must happen in a community of practice which means that an understudy must be within the mentors of the same trade. The rule of the SETA is that four apprentice (a person learning to become an artisan) must work with one experienced artisan for a particular time so that s/he will be showing them the way certain things are done in accordance to the correct procedure. When there is not enough mentors the OJT aspect which is highly important may be affected which may results on the apprentices not learning adequate skills as there may not have enough mentors who are guiding them.

1.3 Theoretical Framework Underpinning the Study

1.3.1 Mentor Teacher/Apprentice Model

- a) Skagen (2004) defines apprenticeship as training in art, trade, or craft under a legal agreement that defines the duration and conditions of the relationship between master and apprentice.
- b) The apprentice model has been enhanced to include general pedagogical model (Nielsen and Kvale, 1999).
- c) There are four key characteristics that govern the apprentice training methodology (Lave, and Wenger, 1991).
 - (i) **Participation in a community of practice.** The apprenticeship takes place in a social organization for instance in a community of craftsmen, like electricians to become an electrician artisan, you must learn electrician trade and your mentor must be an experienced electrician to transfer the skills to you.
 - (ii) **Professional identity:** The apprentice learns by completing practical assignments from basics to more complex. Professionalism is developed by a progression on understanding new skills which are building on the other as he grows.
 - (iii) **Learning through imitation of the master:** The protégé watch the experienced person doing something and he follows the process while he is developing the reflective skills and know how.
 - (iv) **The quality of the work is evaluated through practice:** The mentor is responsible for evaluating the work produced by the apprentice. The quality of the product is judged on the functionality and customer feedback. The situational theory is also plays a role on how certain individual learns.

1.4 Research Problem

The artisans that are produced by Transnet School of Engineering in Durban campus cannot repair machinery and equipment quickly so that are back in service within a short space of time which causes a lot of down time (down time is a word used in the production environment which means the time when all resources are idle or not working to produce the output they are employed to produce) most of the time the and delay on productivity. There are two types of down time; there is a planned down time and unplanned down time, management is concerned about unplanned down time and the planned down time when exceeds the time that was planned for the machine to be back in operation.

The Plant and Equipment Department's maintenance costs has increased exponentially, due to the simple work being outsourced to the private companies who have seen this opportunity are charging exorbitant fees and have arranged themselves as cartels. The training of artisans is being criticized by School of Engineering main client which is Plant and Equipment as a cause of increased costs of doing the business, as the costs of outsourcing the repairs and maintenance are hitting the roof now. The availability of the equipment to do the work it was purchased for has gone down below 80% which is the minimum that operation will accept. It is clear that something has to be done to try and get to the bottom of this problem. The artisan training is part of the major interventions that the government of South Africa has come up with, the state believes that when more skilled people available in the country the economy development of the country will possible increase as there is a linear relationship between a skilled workforce and innovations as well as productivity, Catherine Bolgar (2010).

The government of South Africa is increasing the money to be spent on skilling the youth as a way to fight unemployment as well is to drive economic growth. Society believe that when the workforce of the country is skilled more innovation are experienced which ultimately results on higher productivity which influences the costs per unit produced and competitiveness on the market. The study wish to identify the root causes of the problem. At the moment tensions are high everybody blame that department and that one but nobody have the right answer where the problem lies. The

danger here is that, competitors are focusing on the better way of reducing unplanned down time while Transnet is busy with blame game. When Transnet may not be able to fix the problem of outsourcing the repair and maintenance of its machines and equipment it is running the risk of losing the market share to its competitors which is road freight as the client's frustration drive them away from rail to road as they are reliable. The effects on the local, regional and national economy is huge because the Durban Port Terminals will be full and no space available for incoming cargo from other countries. There will be not enough exports as there are few goods going to the Port due to the delays caused by down time due to poor skilled personnel not releasing the equipment in time even if it's been released it is not reliable its breaks before the planned kilometers are reached. The main challenge of the country is to ensure that enough skilled personnel is being produced whether is the technical or leadership pipeline during the production of these highly sort human resources a quality of the resource have to be looked at as well.

Because if we may produce abundant human resources without checking the quality levels we would not fulfil the basic principle of self-sufficient which is major when we are saying we are independent. Transnet as well have to ensure that during the processing of the inputs to become output the quality of artisans are produced so that the outsourcing will be minimized, the down time will be reduced as well. It is important that the inputs that are part of the production are obtained at a lower costs because when they are expensive they will drive unit costs up which will results on the final goods to be priced high and that will affect competitiveness of its final product. This will ultimately have a ripple effect on the community of Transnet.

1.5 Research Questions

1.5.1 Are the modules being facilitated to the learners aligned to the available machines and equipment in the operation?

1. 5.2 Do we have latest technology in the school to teach students in relation to what is in the workplace?

1.5.3 Do we have enough experienced artisans from which the learners may learn the simple and specialized skills to keep operating equipment running?

1.5.4 Do we have structured method where the learner is able to be evaluated by the mentor during the on the job training?

1.5.5 Do we have enough time for the apprentice to practice so that learning the skills from the experienced artisans can take place/Is the mentor/apprentice relationship conducive for the learners to learn the skills required by the workplace?

1.6 Research Objectives

1.6.1 To understand whether School of Engineering have suitable and latest learning material that is aligned to the latest technology so that the learning by the apprentice is in line with the expectations of the industry.

1.6.2 To understand whether School of Engineering have the latest technology in the school which is encountered by artisans when are transferred to the workplace.

1.6.3 To understand whether the workplace in which the learners are to gain practical have suitable qualified artisans to conduct mentoring and coaching on these apprentices and whether are willing to impart the knowledge and skills to these apprentices.

1.6.4 To understand whether is there a structured approach with regards to evaluation of jobs done by apprentice to ensure an effective learning has taken place.

1.6.5 To understand whether the time allocated by the guiding manual for On Job Training is enough for the learner to gain proper exposure on the actual job activities.

1.7 Research Methodology: Mixed Method Research Approach

According to Fetters (2013) mixed methods research involves the sequential or simultaneous use of both qualitative and quantitative data collection and or data analysis techniques.

The other data was collected using the structured questionnaires from the people involved in plant and equipment department: School of Engineering personnel like lecturers, old artisans, new artisans, supervisors and final the Plant Engineer. These methods gave an allowance of

giving people questionnaires, interview them and also use the available data to analyze like down time and costs for outsourcing from finance department.

1.8 Study Site

The study site refers to a physical area in which the study will take place. This study took place at Transnet Engineering situated at 311 Solomon Mahlangu drive at Bay Head in the city of Durban. The researcher identified this area because it has more potential participants in terms of the artisans, tutors, managers, and apprentices. The sites was better accessible to the researcher hence the researcher was also staying in Durban. The cost of conducting the research in this site was going to reduce costs of travelling. Logistical it was making more business sense to conduct the research in Durban. Findings were generalizable throughout the similar sites in other areas as Richards Bay as both sites were doing similar work studying in the same school as well.

1.9 Significance of the study

South Africa is the country that is at an infantry development stage, for the country to improve economic development and compete with successful countries in the global market it has to ensure that it has the right human resource pool in terms of Knowledge, skills and attitude. At the moment South Africa has a shortage of competent artisans that is why the major projects are not being completed as per the project plans. The number of reworks coming back on certain projects from external companies by Transnet, e.g. Namibia, Tanzania, Mozambique and Zambia has shown that there are challenges on the human resources that Transnet is using which necessitate a study to dig to the root causes of the problem. The other challenge is that Transnet in the Plant and Equipment department is outsourcing a lot of maintenance work which beg answers of why they do that, hence they have one of the biggest apprentice training school in the country that produces artisans, when are they realizing the return on investment?

1.10 Justification/Rationale of the study

This study is important because Transnet Operation in Durban is not doing well financially at the moment and need to know why the down time and costs in relation to maintenance of machinery and equipment is so high.

The potential risk is that, there will be no solution on the challenges faces Transnet Operation in Durban such as down time and ever-increasing costs due to artisan unable to repair and maintain machines that are an input to the operations. The causes of these challenges needs to be answered so that recommendations may be forwarded to authorities who needs to make decisions of what needs to be corrected so that all resources are employed correctly to produce the output as per the needs of the business.

There is potential risk that if Transnet is unable to keep up with the demands of its customers with regards to the availability and reliability of Transnet rail vehicles to transport coal, manganese, iron ore and general goods to and from the South African harbors and in the other sectors of the economy such as power generation entities e.g. Eskom there is danger that the whole country's economy may collapse.

1.11 Ethical Consideration.

When conducting the research it is important to consider and uphold ethical principles when dealing with humans in any research. In this case the researcher obtained ethical clearance from University of KwaZulu Natal Ethics Committee before conducting the research. The researcher also made sure that it's seek consent from all potential participants. The participants were explained about the reasons of the research and also they were informed that the participants was voluntary. Any person who was not eager to participate in the study he or she was at liberty not to participate and nothing was going to happen to him. The potential participants were also informed about their right to appeal in case they felt that they were not treated with dignity and respect by the researcher. The participant's anonymity was clarified to all the participants by the researcher during the signing of the consent declaratory form.

1.12 Limitation of the study

The study focussed only at Durban operations due to resources constraints it became impossible for the researcher to open up the study to other provinces where Transnet operates and they also have same schools producing artisans. However it is anticipated that the findings of the study will be generalised to the other part of the Country where Transnet School of Engineering is operating. This study was mainly focussing to apprenticeship that are used mainly in the manufacturing, maintenance and engineering sector of our economy, the researcher acknowledges that there is a lot of other apprenticeship in other sectors like law practitioners before you become a lawyer there is a period in which a person must spend with the experienced lawyer which is called articles, in the meat processing and bakery industries as well. Only employees of 311 Solomon Mahlangu Drive Durban were given an opportunity to take part on the study.

The apprentice model the study is focussing on is the one that is operating in the manufacturing and engineering fields, not other sectors of the economy. The other challenge that has been observed by the researcher is that there is not enough studies conducted on the same topic. One of the big challenge which limits the study is that when you looking at the investment that is required for an apprentice school is an entire operation which make life difficult as the funding is always a scarce resource. With changes in technology and variety flooding the market and no blue print for specific technology for the country this created a barrier for the researcher as well.

1.13 Summary

This chapter has proffered an introduction of the study where the background, problem identification, the rationale of the study has been explained in details. The chapter also looked at necessity of the study, limitation of the study, ethical clearance, and definitions of specific terms relevant to the study. The chapter also introduced the research report format followed. The next chapter shall look at theoretical framework in details.

Chapter Two: Literature Review

2.1 Introduction

The chapter before this one was introducing the study and outlining the purpose and objectives of the whole research investigation. This chapter is looking at presenting a coherent summary of the previous relevant studies of authors', who worked on the same subject.

According to Khomo (2007:8), it is important that a researcher shows a broad understanding and good grounding about the topic s/he is investigating. Literature review is defined by Major and Savin-Baden (2010:180) as a critical overview of the relevant literature, in order to identify the current state of knowledge of a given topic. This is the core consideration of organizations' and their training and development departments which will be further shown in preceding chapters of the study.

According to definition by (Haan, 2006; McGrath et al., 1995), apprenticeship means that someone signed a contract to learn by working with his hands under the guidance of a qualified artisan who has a vast knowledge to the specific field. According to the Department of Higher Education and Training of South Africa, an Artisan is anyone who has passed a Trade Test in any field of work. Artisans are associated particularly with engineering fields such as electrical, welding, boiler making, and fitting and turning. The type of apprenticeship the study focused on is mainly the one that prepares someone to become an artisan when completed learning. It is important that this distinction be made because different professions have different types of apprenticeships. It is also important that an apprenticeship be define so that it could be properly contextualized. The contract binds both the mentor and a novice to fulfill certain tasks. The apprentice must be at work at a specific time and be willing to take orders from the mentor.

Apprenticeship may take place in both technical and non-technical fields. These are a few of the requirements that is used for the core research of the study.

When a learner registers for a particular trade such as a Fitter apprenticeship which is a technical field, when a person qualifies he/she becomes an artisan who is able to work independent without supervision except in a particular regulated area for example when learning to work in sub-stations. In this case an artisan requires constant supervision until he/she is assessed and found competent to follow specific protocols of working in and with sub stations. For example, a motor mechanic uses his hands a lot, when he is stripping a cylinder head, engine of a vehicle he uses his hands more than any other organ of the body. There is apprenticeship as well on legal profession where a person needs to work under a qualified lawyer for a particular time period before he may get a license of being a lawyer. The context of the study focuses on apprenticeship that focuses on learning a trade, craft etc. Apprenticeship in different countries differs. The study is mainly concerned with Transnet Engineering apprentice training which is governed by the South African legal framework system as well as the reviews done in other countries. Also within Transnet due to the nature of the work on specialized freight vehicles the supervision the artisan has to work under before be competent as an individual is very stringent and structured.

2.2 Changes in Government and Influence in Artisan demography

According to Lundull, in 1991 there was less than 20 000 blacks indentured as apprentices while there were more than 60 000 whites indentured as apprentices, this shows the picture in which race played a major role on attaining apprentice opportunities in our society. When the new government takes over the reins, a change of many laws including that of the training in the workplace took place. There was an increase on blacks' intake to be trained as artisans. The primary goal of the workplace is to produce goods and services but it is also an important site for learning (Fuller and Unwin, 2003). The way apprenticeship in South Africa is being handled has evolved with changes in Governments and increased influence by trade unions. Before the new dispensation getting an apprentice has depended a lot on your race and not on your qualification suitability (Lundall 1997: 60). The later chapters that are presented will show an analysis of this which is quantified.

Some scholars states that on the job training forms part of the major components of learning and prepares the candidate for the workplace (Becker, 1997). Nowadays' expectations of productivity is always a bone of contention between the schooling fraternity and the workplaces. The issue of readiness of the school leavers whether from a university or from FET of GET level. The productivity of any new person in the workplace starts at a low level when he is new but as he hones the skills by practicing during on the job training (OJT) productivity increases as well (Becker, 1964). The apprenticeship to be successful it is important that workplace must be open for the learning so that learners may learn by doing, which create a platform of learning the required skills using the machines that are producing the product that are generating income for the company (Source: CAF website: www.caf-fca.org). In South Africa before a training program begins the prospective apprentice enter into a contract with an Organization which agrees that it will open up the workplace for the learner to learn the practical skills. The company by doing saw is agreeing that it will make available an experienced trade's person to mentor and coach the learner during ojt which forms an important component of the apprentice learning which is explained further in leading chapters of the current study.

2.3 Regulation of Relationship between Mentors and Protégés

Source Skills Development Act 97 of 1998. On average, one certified mentor is responsible for 2.2 apprentices in Germany which shows how Germans take apprenticeship serious with such a small ratio: Source: Federal Statistical Office 2013. It has to be noted that in South Africa there is no formal relationship and ratio between a learner and the artisan which is expected to mentor, and guides the apprentice on the real tasks which becomes part of the evaluation of the learner for the progress to the next phase of learning. That means an agreement is institutionalized as compared to past days in Europe where a contract was agreed on between individuals. Artisans are not being compensated for this job which they feel is an extra burden to them. In an artisan employment contract there is nothing mentioned about mentoring the apprenticeship, but by virtue of being an artisan you become a mentor of the other apprentices as you learned the same way. This brings about the lack of commitment from ensuring that the learner is being mentored correctly. There is also no structured evaluation of the learner by the mentors to ensure that the learner has learned something during the OJT. The study takes this serious issue into account and will show desirable steps to combat this issue between the mentor and learner.

There is a strong feeling that the ratio for apprentices per an artisan needs to be looked at, because it seems to constraint what seem to be the good investment on people skills development as they stipulate 4 apprentices per artisan while industry feels 1:6 may be manageable. For the government to see more good quality artisans produced means revising certain regulations, (Macleod and Hughes, 2006). They further argue that a more structured approach of training on the workplace is required, currently monitoring is lacking because SETAs employ very few skills advisors, and in some sectors the skill advisors are not subject matter expert of trades which make it very hard for them to observe deviations from the criteria as they lack expertise on the field. This ratio will be analysed in the present study to ensure effectiveness.

2.4 Societal Attitude toward Apprenticeship

Apprenticeship is seen by other prospective candidates as something for people whose IQ is inferior as most people who undergoes apprentice they do their institutionalized education at Further Education and Training colleges which is sighted as being having an inferior IQ.

Training helps individuals and organizations to improve. In England, one of the issues that had been the focus of attention by several governments in past decades is that of the status of apprenticeships. For years, apprenticeships have been looked at as a second-class alternative to higher education. While this does appear to be changing in England – with the increase in university fees, the introduction of the Specification of Apprenticeship Standards for England (SASE) and higher apprenticeships all being credited as factors responsible for changing people’s perceptions – this is an issue in other countries too, including India. One of the other key changes in England has been the extension of apprenticeships to adults (in England, defined as those aged over 24). Apprenticeship systems in other countries vary in respect of the age restrictions: in Egypt, France, Germany, India and Turkey, apprenticeships remain the domain of younger people. In Australia, Indonesia and South Africa, the situation is the same as in England: apprenticeships are seen as the province of both young and older adult workers. By contrast, in both Canada and the United States, apprenticeships are seen as a qualification to be undertaken by adults, once they have gained extensive experience for quality, competitiveness, productivity, and incoming changes and set out future ideas (Otoekhile Jonathan Iruobe, pp 344 - 348 (2012)). Organizations are required to commit themselves for providing On Job Training for apprentices. The debate is that the laws governing the apprenticeship are very rigid and the organizations does not see the return rather a more stringent regulation which is heavy

on administration and this causes challenges for the employers. The quantity required to be produced within the short space of time, causing an uproar on the employer's organizations as they feel that the quantity is being favored at the expense of quality of artisans being produced. This area may require the study on its own as at the moment no scientific knowledge available to support or denounce the hypotheses. The level of work and ways to improve the level of quality will be primarily discussed in chapter 4 and 5. According to (Mbatha, N. and Wildschut, A. 2014), historical developments in technical and vocational education and training in South Africa clarifies reasoning behind artisan skilling and labour market schemes reflect specific racial, sectoral, and occupational and skills level characteristics. While causalities and the chronology of key events will surely be contested in any historical account, this discussion highlights the fact that the history of artisan development in the country is deeply embedded in the needs of the labour market, political imperatives and societal pressures of particular points in time. Furthermore, interplay between various parts of these systems at different points in the historical route has had profound implications for the success or failure of political, social and economic objectives (Elliot, G. 2009). Professor Heike Solga, states that other causes of negative attitudes of apprentice career paths is the fact that, politicians tend to aim apprenticeship as for people who are less intelligent which creates a drawback to the prospective candidates. (Solgar, 2017), states that if apprenticeship was only for people who are academically less achievers, it was less likely to work. Solgar was dismissing the connotation that when you join apprenticeship is because you are less achieving academically, which created a stigma and resulting to many potential candidates to snub it.

The benefits of apprenticeship according to (Armstrong, 2008) employers if they may open their hearts and open their workplaces as learning areas, apprenticeship program has more net benefits than costs, in the form of new innovations, extra hands during the OJT where more labour is available, tax rebates from the ministry of finance and productivity of the organization when utilizing skilled employees. The other challenges are new regulations in the form of South African Skills Development Act 97 of 1998 which give SETAs (Sector Education and Training Authority) powers to decide ratio of a journeyman to apprentice, employers see this as a big challenge for them because if you agree to open your operation as a learning area you are also required to employ more artisans to become mentors of these people, with the demand to produce so much in a short space the quality is being compromised. This topic is further explained in chapters 4, 5 and the closing main chapters of the study.

Apprenticeships training approach is a very good model because it focuses on the young people who are vulnerable in many respects as they are young with no job exposure whatsoever for them to be absorbed by the economy, for them to be able to enter the market there is a great need for them to possess specific skills that is in demand (Barak, M., Lipson A., Lerman, S. 2006). Apprenticeship system take them off the street keep them somewhere learning a skill which may change the fortunes of that young person, (Vickerstaffe, 2007). Vickerstaffe, 2007 further express that, apprenticeship when all stakeholders adopt an approach that will make all win it is a good platform to create a pool of future employees for any economy. Also, it is important to note that when there is more people with skills in the country that are participating to the economy more investment may be realized as investors trust the economy with more skilled personnel, (Bolgar, 2010).

The general consensus among the scholars who have studied this topic is that apprenticeship remains the major way to create job opportunities of the young people in the economies of the world. They agree that OJT remains the major part of apprenticeship for any country and economy to succeed in the ever-changing economic environment (Jacoby, 2014 and Bass, 2015). They also agreed on the lack of governments to engage all stakeholders equal. One of the biggest challenge sighted by some scholars is the extent to which this area is regulated. They further look at the challenges faced by apprenticeship programs. They sight few: lack of proper engagement, regulations around ratios of apprentice to artisan, lack of coordinated efforts among stakeholders which manifest itself on mismatch of the supply of skills and that of demand of skills, lack of funding and incentive for employers to open their workplace as learning areas, the demand to produce many artisans within a short space of time which they feel compromises quality.

Germany is a European country that has very low youth unemployment rate due to its vibrant apprentice program of dual system compared to other developed countries and Europe in general (Tamar Jacoby, 2017). The table below illustrates the unemployment rates within the developed European countries and showing the benefits of having an apprentice system that is working well to develop vocational skills among the youth. Germany is the only country in Europe that is investing a lot of money in the apprentice training through its Vocational and Technical Education (VTE). This is paying off and is being envied by other countries including US. The dual training method of Germans captures the hearts and souls of every aspired apprenticeship. Trainees splits their learning into two categories there are days for classroom and there are days for on the job at a specific company. This method is supported by

government and all stakeholders are aware and are supporting it as it is something for developing human capital of the country. The training of an apprentice takes between two and four years. The quality of artisan they are producing are balanced they have an exposure of the real working world and institutionalized from vocational public institutions. There is a great respect from everybody for practical work in their industries, they do this because they are expecting the best talent out of the traineeship period so that it can produced the best results in the workplace. The table below illustrate unemployment in general and youth unemployment rate among European countries to show that a country with vibrant apprentice system is able to decrease unemployment among its citizens.

2. 5 Unemployment rate among youth in different countries with apprentice systems.

Table 1 Apprenticeship and Youth Employment

Country	Total Unemployment	Unemployment Rate	Gap
Germany	5.3	7.9	2.6
Austria	4.3	8.7	4.4
Netherland	6.7	11.9	4.3
Czeck Republic	7.0	18.9	11.9
UK	7.9	21.0	13.1
France	10.8	25.5	14.7
Poland	10.4	27.4	17.0
Slovakia	14.2	33.6	19.4
Spain	26.4	55.7	29.3

Most literature concentrate on the things that researcher thinks they are traditional like OJT and institutionalize training (Skills Development Act 97 of 1998, ILO, 2012). The researcher’s personal opinion is that there has been not enough efforts to investigate the impact of ever-changing technology in economic landscape (Brandt, Farmer Jr., & Buckmaster, 1993). If you look around the apprentice schools still using the equipment that was used in the last 40 years if not more while the economy is moving to the fourth economic revolution in the next century. Long time ago there were shaping machines, in the Turner Machinist trade but nowadays those machines are not available because automatic or digital lathes and milling machines have taken over, while the learning material has not been aligned to the new operation methods, this is

being blamed to the lack of coordination from the authorities (Pratt, 1998 and Barab & Hay, p. 72, 2001). The time that takes to produce an overarching artisan is also questionable by the scholars. The structured approach to how the competency of the learner when he completes the practical work needs to be visited as well. The artisan or supervisor needs to administer the test to check if the learner has actual learned during the time of his on Job Training. If there deviations the interview of concern should be done on both the learner and an artisan. The learner should not be allow to continue to the next stage unless he passes the practical test.

2.7 Criticism of Apprenticeship Model as a complete workplace learning technique.

Some critics are say that apprenticeship model has nothing to do with mentoring. The action-reflection model came as a substitute to the traditional apprenticeship (Cropper, B., Dick, B., Donaldson, B., and Patty, C., 2002). The critics of apprenticeship argue that this traditional method creates parrot teaching as all learners are encouraged to imitate their mentors. Critics further argue that the fact that the mentor must be competent it means that only people competent may be suitable for conducting mentoring on the apprenticeship model, this may limit how many apprentices may be taken and able to learn in a particular time as competent mentors may be scarce due to the terms associate with opportunity costs. Opportunity costs in this case comes about when the mentor is helping the apprentice so that he/she may gain knowledge and skill to do a particular job. The rate of producing at a quick pace decreases as the apprentice is still on a learning mode where he/she is working slowly. The number of units as measured per hour decreases until the learner masters the work.

The mentor while he/she is mentoring the learner is idle and doing nothing as the machines are limited per workplace. The other critic is that learning in this model only take the form of face to face or proximity due to the stringent requirements of mentor ratio as well as physical availability of workplace and certain types of equipment (Pratt and Johnson, 1998). They further argue that practitioners are mostly having difficulties in expressing intentionally the picture and the know-how that they have gained over the years. Usually they take for granted that the skills they have gained is easy and expecting the apprentices to mimic them in a short space of time. There is also a question of small numbers of apprentice who may be taken by any organisation because of the availability of mentors as well.

The other criticism of the apprenticeship system is that there is no clear direction who seat on the driving seat for it to produce the desired results, is it Technical Vocational Education and Training colleges (TVET) or employers? (www.gov.uk, 2018). Employers on the other side are crying about poor quality of apprentices and TVET on the other side are complaining about the lack of support from employers in respect of providing quality of workplace exposure that is going to produce best results for everybody. The cost associated with training apprentice not all companies are willing to forego (Hogarth and Hasluck, 1997). Employers in small firms are not willing to commit on apprenticeship because they fill that it has high burden than benefits.

2.8 Artisans as a catalyst of Economic Growth

According to John Kerry U.S Secretary of State “If you are looking for innovative ways to help developing countries flourish, artisans are a terrific place to begin with,” He was speaking at a forum of the state departments in September 2015, about the impact artisans have on communities as well as on the global economy. He sees it as an engine to reduce poverty and economic development for the developing countries. He was speaking at the Global Campaign for the Alliance for Artisan Enterprise. He felt that artisan sector is one of the largest employer of the people in the developing countries. Any artisan person is able to open up his/her small workshop behind his house do small jobs and able to employ few people to help him thus creating the jobs and helping in poverty eradication as well. “Most people still do not understand the full economic value of the sector,” said Peggy Clark, the vice president of policy programs at the Aspen Institute and Director of the alliance of Artisan Enterprise. There is a new trend now in the apprenticeship fraternity where there are artisans that are produced by Technical Vocational and Education Training Colleges and certain colleges where the quality of them is far below the expected standard. In most of the time they come with certificates but they are highly unemployable due to high competition out there. The major challenge is that they either never touched a machine that they would be working with or they have had a very limited time during the time when they were preparing for the trade test. This is according to Sean Jones, who is the director of the Artisan Training Institute of South Africa. His believe is that we are pushing quantities that are not going to be able to get or even able to create their own jobs. According to Joe Samuels, CEO of the South African Qualifications Authority (SAQA), vocational and occupational education and training is a key to taking economy to the next level of development. Samuels emphasizes the point that colleges should focus on producing quality artisans. The outcry about the quality of artisans being produced at the

schools on the current setting and system seem to be wide. This is attributed to the fact that different people and other employers are also complaining about it. The research that was conducted by Manpower Group's Ninth Talent Shortage Survey revealed the following. The 15% of the employers responded on the survey revealed that they had challenges with regards to the quality of skills the artisans were having which means that, there was a specific challenge when it comes to the apprenticeship skills development at large.

2.8.1 The influence of apprenticeship on Youth employability in general

At a point when youth unemployment was a particular challenge, the Apprenticeship Grant for Employers was designed to contribute to improving this by increasing the number of businesses engaged with the programme, and thereby creating more vacancies for young people (Miller, 2013)

United Kingdom made available a grant of £1,500 to businesses who recruited an 18 - 24 year old youth to an apprenticeship. The evaluation was delivered in partnership by BMG Research and IES, with IES leading on provider research and the return-on-investment assessment and BMG leading consultations with national stakeholders and employers. The government continued to offer the grant beyond the initial period envisaged and, as a consequence, the evaluation research continued.

According to the leading researcher Linda Miller from Institute for Employment studies the results revealed that income of an employee who obtained an apprenticeship qualification was 15% more than a person who had no qualification at all. The employability of young people also increased by 6% as compared when a person had no qualification.

These long-term gains greatly surpass the costs that programme participants face in undertaking an apprenticeship. Because remuneration for apprentices tends to be lower than pay levels in regular employment, the main measurable cost is a short-term income loss. We calculated that, over the duration of the apprenticeship, this income loss amounts to between £8,900 and £15,400, which constitutes a small fraction of the long-term benefits. From the apprentices' point of view, therefore, undertaking an apprenticeship is a very profitable investment.

To summarize, the researcher's analysis confirmed that the creation of more vibrant apprenticeships could yield long term benefits for our society at large. Especially, when government may make more grant available for the organizations that are prepared to indenture apprentices so that they may see befitting to contract apprentices.

2.9 Framework for artisans training and development

The global exposure shows that countries who have managed to win both the war of skills and artisan quality in line with productivity, employment and economic development have introduced artisan development policies that are linked to three main objectives as follows:

- 2.9.1 Matching current skills demand with supply of specific skills.
- 2.9.2 Reorganization of worker skills in line with changes in the market.
- 2.9.3 Building the competencies in line with future skills demand.

The 1st objective is about quality and relevancy of the available skills to ensure there are no mismatch (Cedefop, 2012a). The second objective answers the question of low demand of specific skills in a particular sector while the other sector is booming. The quality of skills provided by skills training providers requires that they are able to have equipment that are relevant to the current situation. They have to be abreast with what kind of future skills are relevant so that they are able to provide skills intelligent to the market and establishment in which they provide artisans (Cedefop, 2012b). The developed countries have managed to ease the burden by ensuring that the transition is smooth between the sectors by providing information systems that are able to detect in advance the changes so that they may be able provide overlapping solutions. The International Labour Organization (ILO) 97th labour conference in 2008, has called for the holistic approach to skills development and is advocating that, the following be included in the framework of skills development:

- 2.9.4 Continuous and seamless pathways of learning.
- 2.9.5 Development of core skills
- 2.9.6 Developing of higher level skills
- 2.9.7 Developing skills that are portable in case a person wish to leave a sector to the other sector or country.

2.9.8 Skills should be employable either as a worker or as a self-employed person entrepreneurial acumen.

One of the call made by the G20 leaders in one of their meeting in 2010, they advocated that it was no longer enough to train artisans to meet current skills demand but training artisans to meet future skills sets of the future as well. That is where the European Commission for future skills was established which is what was is seen as a challenge for Transnet Engineering' School of Engineering.

All future vehicles either locomotive or wagons requires that an artisan be able to read the technology called programmable logic controller (PLC) and Variable Speed Drive to be able to detect fault and repair them as quickly as possible (Cappelli, P. 2012). The current and future rail vehicles and automotive vehicles are all fitted with high technical technology that requires an artisan to be skilled and familiar with them to be successful on its job. It got nothing to do with quality of the artisan but to do with the new skills set required which is the intelligent that is lacking if you see the picture. It is highly important to be able to foresee the future skills needs and set up the skills providers in such a way that they are able to provide the skills before they are needed. During and before the prototypes it is important that the skills providers know the skills required. This may only happen where both business sector and training institutions work together. Business know the investment they are going to make in the future, what kind of equipment they are going to buy, government knows what project are anticipated and the set of skills that would be required. Those are areas that may be used to align and forecast the skills set that may be required and a proper planning be implemented to ensure that people are trained on relevant skills so that are able to deliver on what is required. What has been identified is that there are two conundrums which needs to corroborate as they needs each other. The world of learning produces the skills, while the world of work produces goods and services. These are two apart spheres which are highly dependent on each other for executing their mandates to the best level. The skills providers needs the business to tell it what kind of skills are required so that they are able to produce them, for the businesses to thrive they need the skills providers to produce relevant skills for them to be able to produce goods and services that are required by the end users. Both these sectors need each other to execute its mandates. There is a need for formulation of a strong partnership between government, business and workers so that there is a relationship between the world of learning and the world of working.

2.10 Training quality and relevant skills

It is highly important that all stakeholders on education and training are making sure that skills development system deliver dual result of quantity and quality artisans of a training that is needed. This requires that from the word go that the system supplied enough and qualified teachers, trainers, and master artisans that are able to coach and guide apprentices (Morgan, 2016). The mentors needs to be given an opportunity to periodical upgrade their skills to remain relevant and impart the knowledge and skills to the protégés. Properly staffed and sufficiently financed skills development providers are key to skills development future plans. Periodic reviews are important for effectiveness of the system. Infrastructure of training institutions requires that a

continuous improvement and innovative ideas are constantly applied as changes are constant to our world (Heller, 2009). The changes in technology requires that training institutions are abreast evolution in the field of technology so that new learning methods are developed to be relevant with what is required in the market. Flexibility and agility important for institutions of training to respond to continuous changes of the labour market conditions. Training institutions should be able to continuously adapt curricula and update the skills of teachers and trainers to respond with current and future skills sets so that they are able to impart the skills as demanded by times.

The quality training further highly depends on the maintenance of high quality of training contents, material, facilities and material. Skills standards should be set and tested by the involvement of all stakeholders in the development. Lifelong learning highly depends on properly integration between classroom education as well as work place learning where the application of the skills takes place and the test of quality and resilience is being tested. One of the basic principle of learning new and high technical skills that are coupled with the new technology development are to be able to obtain the correct foundation of education at a young age which is delivering us to another debate if we consider the background of our country and the legacy it has left even today.

Some of the challenges that are being experienced in the world of work are not because people like it but they came as a results of the past. Some of the apprentices' background are so bad that to put together a sentence in English is a mission while the whole curriculum is English. To absorb quality education is very hard as the medium of delivery is far to be understood by the apprentice. To reap the quality education and artisan at a later stage the foundation in

literacy and numeracy should be strong. The quality of learning with the aim to produce quality artisan should be the focus of all nations especial the developing countries if they want to see the growth in their economy (Parker, 2016). Parker believe that the focus should be shifted from quantity in other words rushing to produce more artisans that are ineffective and inefficiency and still unable to meet the requirements of the counterpart in other part of the world.

All enterprises are mainly concern with cutting the time is spent when producing the unit product. That alone comes with a pressure of ensuring that human capital is twice if not more efficient on production so that production costs per unit is cut while the expectation of high quality end results is not compromised. The challenged posed by the changing of our production houses by buying high speed machines while they are chasing quicker production results, it is in conflict with the state of our human resources. The alignment between the schools that are producing human resources that is supposed to be able to work in those machines leave a lot to be desired. It is not the fault of human resources but is a combination of the lack of integration between the policies of our society, employers and institutions of learning whether skill based or knowledge based.

These stakeholders they need to work together in this matter. Schools needs to produce human resources based on the future demand forecast of the skills and in line with the technology that is being anticipated so that are able to invest in it. The skills will give employees the opportunity to be innovative and able to work in highly polished new designs. One of the challenges posed by the technology is to create obsolete human resources. Even artisans that were rated highly during the steam engines today are becoming redundant because the set of skills required today and the set of skill they have is total different. Today brakes in cars, trains, are electronics. The companies who were manufacturing air braking systems have evolved and introduce electronics braking system that are using digital technology, this is causing a lot of mismatch of skills available compared to the kills required. The alignment among the stakeholders cannot be over emphasized as more and more people are being produced as artisans but are unable to give the employers what they are looking for.

2.11 Quality of Artisans and Increased Innovations

When artisans are of a good quality its replicate to the productivity and innovative ideas which brings about continuous improvement in the production process (Heller, 2009). In an

organization that wish to survive on the global competitive business world will never take advice for continuous improvement for granted. For surviving in the world of business as an organization you should remain creative so that you meet the demands placed to you by your clients and competitors. For us to come out of doldrums of only being the consumers of other countries product we need to emphasize the linkage that needs to be created among all the stakeholders of the country. Innovative and creative ideas comes from the quality human capital that are able to continue learning, designing new products which industry and a country may introduce to the market as its product of competing in the market. For us as a country to meet the future demands on skills we need to ensure that we remain relevant by improving skills that are aligned to development of technology and other advanced production processes.

2.12 Artisans Training in the other countries

In South Africa there are three main ways in which a person may become an artisan. One is through the normal apprenticeship which is mainly for youth where the contract is not less than twenty four months to 36 months. The second way is through learner ship where a person may enter into a contract of learner ship with an employer for a workplace component and a vocational technical training where specific institutionalized training may take place. The learner ship may take the form of months in terms of the contract but the modules learned and a person has been tested on them accumulates credits that builds the required number of credits which may qualify him to apply for a trade test when he has sufficient credits. The third way of attaining artisan status is through what is called Artisan Recognition of Prior Learning (ARPL). This method recognizes people who have been working with artisans for a longer period and have gained the required knowledge and skills to be tested and qualified as artisans. The source here is the skills Development Act 97 of 1998 as amended with all its regulations. The challenge with that is that we mean to have more details. In South Africa to become an artisan you requires a certain minimum education level. When you following an apprenticeship you should be more than 16 years of age in South Africa. Anybody whose age is 16 and below is considered a minor is not eligible for any work environment. South Africa model of apprenticeship training it used to be regulated by Education and Training Quality Assurance (ETQA) bodies which were ensuring that the curriculum content is at a required standard. ETQAs were working hand in hand with all stakeholders, like industry, labour and relevant government department.

With the amendment of Skills Development Act of 1998, there is a provision of Quality Council on Trades and Occupations. This body consists of subject matter experts from industry, department of higher education and training and labour. The aim is to regulate the standard in which apprentice training follows. This entity develop and review curriculum content, set and review assessment sheets of each trades, quality assured the issuing of certificate when a person is has passed trade test.

According to Pfeifer, 2013, German is one of the country that believes on tri-partite alliance when it comes to education and training their methodology includes firms, unions and training institutions where the knowledge and skills content is formally regulated which is expected to be assessed when a person is ready after undergoing apprenticeship over the three to four year period. Furthermore, they contain a duration and the criteria for the final assessment. The training regulations are occupation-specific and are developed by tripartite working parties, who communicate the results of their work to either the Ministry of Trade and Commerce or the Ministry for Education and Research, which formally approves the regulation. The training regulations apply to all companies training apprentices in an occupation in Germany.

In Australia, accredited training is organised around training packages, which define the competency standards, qualifications and assessment guidelines for qualifications. Training packages are not specific to individual occupations, but rather describe the competencies and skills needed in work roles or even in a specific (usually large) company. They are relevant for both the training company¹ and the off-the-job training organisation (RTO). In theory, all of the parties (employer, employee and RTO) involved develop a training plan, in which the competency and skill development, as well as the intended outcome, are determined. Until recently, training packages were developed and updated through the industry skills councils. Recently, however, a new governance structure was introduced for the development and review of training packages.

The change to a competency-based training model and the introduction of training packages as a way of standardising competencies have triggered some criticism in the Vocational Education and Training (VET) research community. The issues being put forward is that competency-based training is a way ‘through which the working class is deprived of an access to the great knowledge represented by the academic disciplines’ (Wheelahan 2007, p.637). (Misko, 2006)

further emphasises that giving employers the flexibility of choosing the competencies they require from training packages may come ‘at the expense of an in-depth preparation for the occupation as a whole, (Misko, 2006, pg. 34) also highlights the risk of employers not choosing the right training packages if they are unaware of all training package options. On the other side, (Simons et al. 2003) stress the potential for improvement by new and flexible approaches to training and assessment by defining ‘endpoints for learning but not how to get there, (Smith, 2002, pg. 7) provides a review of critical literature on training packages.

2.12.1 Quality assurance of Apprentice Training in other countries

In Australia, regulation of training has undergone some changes over time and great emphasis is now placed on the skills outcomes of training as well as issues such as consumer protection. In 2011, a national regulator for Vocational Education and Training (VET) was established, the Australian Skills Quality Authority (ASQA). The mandate of this body is to regulate accreditation of Vocational Education and Training (VET) providers and assessment of candidates who are ready to go to the next stage or final summative assessment.

Additionally, in 2011, Vocational Education and Training Quality Framework was announced (with similar intent to the preceding Australian Quality Training Framework [AQTF]). This structure supports quality in the system and consist of the standards for national VET registered training providers. It aims to standardised vocational education and training throughout Australia through registration and monitoring training and assessment so that the standard is maintained to the correct level (Misko, 2016).

In 2015 new arrangements were put in place for the development of training products, aimed at giving industry a greater voice in VET policy-making. To this end, the Australian Industry and Skills Committee (AISC) was created and comprises chief executive officers of major enterprises and industry peak bodies. The role of the committee is, among other things, to advise government on quality standards, endorse qualifications, provide industry input into the direction for VET research, and industry input into the ministerial council (Misko 2016). In addition, industry reference committees (IRCs) were appointed by the Australian Industry and Skills Committee to represent the needs of particular industry sub-sectors, while service skills organisations (SSOs) were formed to assist the IRCs.

In Germany, there are two chambers that deal with regulation of vocational training and development of artisan, one is called chambers of commerce and other is called chamber of trade which has two main functions in training's quality assurance. First, the chambers are mandated by the Vocational Training Act of Germany to enforce and monitor the quality of the training provided by training providers and companies. Second function is to govern the registration of apprentices and organising the assessment and examination of their skills by the tripartite examination committee. Finally, they are important for accrediting a firm's training capability. In order to train apprentices, every company has to nominate a person who has obtained the trainer qualification, which proves he understands education and teaching of people and may be trusted for training of apprentices.

The strong role of the chambers has been criticised, especially by the unions, as they represent their members' (firms') interests, as well as being assigned to monitor training quality on behalf of apprentices (Deutscher Gewerkschaftsbund (DGB) 2015).

In the German apprenticeship system has two bodies that regulate quality of apprentice training, one is works councils and trade chambers that we have covered above, both play an important role in quality assurance. Works councils can be established by employees in any company employing more than five workers, with the likelihood of having a council increasing as the size of the firm increases. Although only around 10% of all companies have a works council, more than 40% of all employees are working in a company with one (Ellguth & Kohaut 2014). The Works Constitution Act is the legal framework defining the rights and duties of works councils, and explicitly describes their role as a one of quality assurance. In a recent study, (Kriechel et al. 2014), found that companies with a works council invest more resources in training apprentices and employ a larger share of training graduates on a long-term basis. With respect to off-the-job training, quality assurance is undertaken by the respective state departments responsible for that area of vocational training.

2.13 Conclusion

In conclusion literature has been able to identify quality of education in general as a source of productivity and competitiveness of the organizations. Literature is also emphasizing the link among stakeholders where learning institutions, government and businesses should work together to shape the quality of education in general which will replicate to quality of artisans

produced by the skills providers as they would have received good literacy and numeracy at foundation level. The type of skills required in the future remains the thorny issue on the party of skills development institutions as they are seem to be behind while they are tasked by producing human resource that should be utilized in the production environment by employers. It has become clear that at this point in time what is expected when it comes to quality artisan is not only the function of School of Engineering but it is also the function of the end users which is business units in this case. Coordinating the future skills demand brought about by the changes in technology improvement as well as shift in manufacturing sector due to saturations of the market to green economy and digitalization of the manufacturing processes was also discussed in length in the literature review. The impact of skilled human resources was also discussed in length.

Chapter Three: Research Methodology

3.1 Introduction

The previous chapter discussed the background of the quality of artisan as a concept in question. The aim of this chapter is to discuss the method used when conducting the study. The research design that was followed on this study is called mixed method research design. Creswell, (2008) argued that this methods involved both quantitative and qualitative research methodology and he state that this results in complimentary effects and the stability of finding as they are not linear to one method. This chapter explains and define the population, method of sampling, questionnaire administration, what is data collection and data analysis. Research methodology includes ways of data collection and analysis. This type will help the researcher to get data that will explain the crux of the challenge that is facing Transnet Operations in Durban area. This type of study will give an opportunity to the researcher to receive data and analyze it in line with the allegations of poor quality of artisans. If the hypotheses is confirmed or being refuted the descriptive design will be able to answer the question like what are challenges if the allegations are refuted if they are confirmed the data will be analyze with an aim to get to the correct recommendations to be implemented as preventative mechanisms.

The chapter before this was concerned with the theoretical background, contribution of the proposed study and the significance to do the study in question. The aim of this chapter is to outline the methodology to be used in the study. The chapter will briefly describe and clarify specific terms like population, sampling, research instruments, and administration of the questionnaire, the data collection and date analysis. Methodology is the practice followed by the researcher in collecting and analyzing data on her/his disposal (Silverman, 2008). Khomo (2007), stated that methodology is the critical component of the research because it guides the researcher when conducting his/her investigation of the problem statement. This research project intends to answer the question whether the artisan produced by school of engineering are of poor quality and that is why the down time and maintenance of machinery and equipment are such a poor state of affairs in Transnet Operation in Durban. This research will be using mixed method approach. This means that the researcher will use quantitative and qualitative methods in the study. The research approach will collect and analyze data from available statistics as well as collect human resources opinion through interviews and questionnaires to the sampled participants from the population. The next section will clarify the site in which the study will be conducted.

3.2 Study Objectives

This chapter is the chapter that is focusing on key objectives of the study as they are outlined in chapter one as the framework of the study being instituted. The objectives of the study are as follows:

- 3.2.1 To understand whether School of Engineering have suitable and latest modules aligned to the latest technology so that the learning by the apprentice is in line with the expectations of the industry.
- 3.2.2 To understand whether School of Engineering have the latest technology in the school which is encountered by artisans when are transferred to the workplace.
- 3.2.3 To understand whether the workplace in which the learners are to gain practical have suitable qualified artisans to conduct mentoring and coaching on these apprentices and whether are willing to impart the knowledge and skills to these apprentices.
- 3.2.4 To understand whether is there a structured approach with regards to evaluation of jobs done by apprentice to ensure an effective learning has taken place.
- 3.2.5 To understand whether the time allocated by the guiding manual for On Job Training is enough for the learner to gain proper exposure on the actual job activities.

3.3 Research Questions

This chapter is also going to have a thorough discussion about the means to answer the study questions as discussed in chapter. The study questions are as follows:

- 3.3.1 Are the modules being facilitated to the learners aligned to the available machines and equipment in the operation?
- 3. 3.2 Do we have latest technology in the school to teach students in relation to what is in the workplace?
- 3.3.3 Do we have enough experienced artisans from which the learners may learn the simple and specialized skills to keep operating equipment running?
- 3.3.4 Do we have structured method where the learner is able to be evaluated by the mentor during the on the job training?

3.3.5 Do we have enough time for the apprentice to practice so that learning the skills from the experienced artisans can take place/Is the mentor/apprentice relationship conducive for the learners to learn the skills required by the workplace?

3.4 Study Site

Transnet Durban operation has two main centers in which it does business. There is a site at 311 Solomon Mahlangu Drive and the other one at South Dune in Richards Bay. The site in Durban has four main business units that form the entire operation, they are Locomotive Factory, Coaches Refurbishment, Wagon Factory and Wheels business. At Richards Bay there are three main businesses that form the sub-businesses of the Transnet Durban operation. Machinery, Plant and Equipment section support these businesses with the artisans that are produced by Transnet School of Engineering. There are 610 artisans working on these businesses doing repairs and maintenance of the machines and equipment for production purposes. There are 101 artisans working in Richards Bay businesses and 509 artisans working in the Solomon Mahlangu operation. From Durban to Richards Bay is about 400 KM return. These sites are a major contributors to the economy of KwaZulu-Natal because they have to ensure that the maintenance of Wagons, the refurbishment of Locomotives and Coaches are in line with the requirement of the two main clients so that commuters have a reliable source of Transport to and from work.

The Durban Business centers and factories around the KZN rely on the employees who are using the trains that are repaired and maintained by the artisans coming from Transnet School of Engineering through the Machinery, Plant and equipment. Locomotives that are also rebuilds in the factory also play a major role by hauling the wagons that are full of coal coming from South African mines to Richards Bay Coal Terminal for export. These are major service that are affected when there are not enough trains, locomotives and wagons available in service due to poor quality of workmanship or they delay due to repairs that are unreliable that caused frequent breakdowns causing out of service of trains, locomotives and wagons. The competition that is posed by road transportation due to unreliable service by Transnet rail transportation network system is increasingly gaining momentum. The larger scope of things is that any country whose rail network system is not reliable whether from infrastructure or users it is a threat to the country's economic development strategy because roads maintenance costs are always high due to trucks damaging it as the life span of the road is not catered for

heavy loads like those that being transported by trucks. The next section will look at the target population will define and explain it. The research was only conducted at 311 Solomon Mahlangu drive due to the fact that the sites are operating similar and results can be generalized.

3.5 Research approach/paradigm

In the research there are two well-known research methodologies (Rajasekar, 2013). According to Rajasekar et al, 2013 those research methodologies are **quantitative** and **qualitative** methods. He further states that Quantitative research is based on the measurement of quantity or amount. He argues that a process is expressed or described in terms of one or more quantities, percentages, trends, prevalence and statistical analysis. It is very helpful to answer questions like, how many, how much etc. it also very useful in describing data in detail using statistical formulas. It also uses questionnaires in its collection of data. The research will benefits on using it since it seek to understand if there is enough information available in the area which will help the students to obtain opportunities available to further their careers.

Qualitative research methods follow the collection of data by allowing a researcher to hear the opinions of the people affected by the situation. The research methods allow allay of personal feelings, opinions, motives, desires and etc. It could use in-depth interviews, arrange focus group discussions, observations and documents analysis. The other data collection method that is useful is Mixed Research Method; in this case the researcher used both quantitative and qualitative approaches in the same study to draw advantages from both of them (Patton, 2005, Rea, 1997, and Rubin, 2008). This study used mixed research methodology due to its complimentary nature on the unknown questions being investigated (Creswell and Clark, 2011).

3.3.1 Data Collection Method

The survey questionnaires and in depth interviews were used as main methods of data collection during the research. Because the research used mix method approach for getting more in depth of trying to solicit the real cause of the problem interviews as well were used. There were 50 questionnaires that were self-administered. 23 questionnaires came back. This represent 46% of the respondents. This study was confine only at 311 Solomon Mahlangu in

Durban. It took a period of three months to collect the data from the participants. There were in depth interviews that were conducted by the researcher face to face with participants. Face to face discussions with the participants by the researcher as recommended by Sekaran and Bougie (2013: 147) that they give participants a chance to ask questions for clarification and also allow for the researcher to read the body expressions of the participants. There were five questions that were administered through the in depth interview and the responses were recorded instantly by the researcher. The survey questionnaires followed the Likert scale type of questions. Researcher deemed necessary to formulate questions that are related to artisans/apprentice development and vocational and training schools types.

3.5 Target population

The previous section represented the study site in detail where the study was conducted. Target population is defined as the units/subjects the research seek to obtain certain data from (Trochim, 2006). According to (Fox, 2010) target population is any group of people, objects or events sharing the same characteristics and representing the whole or sum total of cases involved in the research project. This study's population are all employees working in 311 Solomon Mahlangu Drive at Durban in the Machinery, Plant and Equipment as well as Transnet School of Engineering departments. These employees are all involve somehow or the other on nurturing the apprentices to become artisans that are working in the Machinery, Plant and Equipment section of Transnet Operation in 311 Solomon Mahlangu Drive. The target population is made up of Artisans, Supervisors, Tutors, Apprentices and Managers. The target population has 642 employees in total. There are 450 artisans, 10 supervisors, 17 tutors, 160 Apprentices and 5 managers. Artisans are further divided into two groups, 155 master artisans and 295 normal artisans, master artisans are those who have a vast experience in the field, they are being used as mentors for apprentices during On Job Training components of the apprenticeship and newly qualified artisans.

3.6 Sampling strategy

Sample is the word that refers to the subset of the entire population selected to participate in a study. Note: the researcher selects the site and target population, selects the accessible population, states the eligibility criteria, outlines the sampling method, decides on the sample

size, and recruits the sample. It is always at the researcher's advantage to keep the study to a small number but well-chosen group of subjects representing a wider group of the population (Bless, 2010). He further states that, in research, it is likely to reach correct conclusions by examining a portion of a wider group. Descombe, in De Vos (2011) defines sampling as a process of taking a portion of wider and smaller number of units from the population as representing the total population.

According to Yin (2009), a sample is a subset of the entire population from which the data is going to be collected by the researcher. According to Silverman (2008), sampling has two main functions: representativeness, and allowing the researcher to make broader inferences. For this research project, a sample will be derived from all subsets of the population. The researcher intend to have a sample of artisans both level represented, supervisors, tutors, apprentices and management. This is important to hear all views so that the broader and undistorted inference may be made by the researcher.

Both probability and non-probability sampling methods will be employed to select participants on this study. The advantage of using both selecting techniques is that it helps the researcher to have some kind of judgement on certain areas of the study as he might have an interest on the topic in question. Probability sampling gives all units equal chances to be included on the sample that is going to participate on the study. Simple Random sampling methods will be employed on selecting the participants. The stratification method will be employed to cluster the participants into five groups. The participants was grouped per their activities such as artisans, tutors who are producing the artisans, supervisors, apprentices and management. It is important that the views of all these categories be represented so that the accurate inference is made.

3.7 Sample size

Sampling is a process of identifying, recruiting and choosing few units from the larger group that will represent the whole group (Yin, 2009). The sample size refers to the number people that are going to be chosen to represent the entire group. The two sites which is Solomon Mahlangu and Richards Bay have 4 main groups as follows.

- **Solomon Mahlangu**

- Normal artisans =249
- Master artisans =100
- Supervisors =8
- Management =5
- Mechanical Tutors =9
- Electrical Tutors = 8
- Apprentices in third year =160

- **Richards Bay**

- Master artisans =32
- Normal artisans =69
- Supervisors =2

Only Durban was chosen as a sample due to the fact that the target population is involved in the same activities and it was relevant to generalised the findings to all the entire operations, the 20 artisans and 10 apprentices on their third phase were chosen using random sampling method based on the data obtained from human resources department. For management, supervisors and tutors the purposive approach was utilised as their views were needed to be heard as they are representing voice of the customer and production factory that is producing the artisan whether they are in the operation or in the school they play different roles on producing these artisans. The tutors are involved with institutionalised, supervisors are involved on allocating On Job Training to the apprentices while management is involved in planning the resources that are used to produce artisans. The researcher used simple random sampling method when selecting 20 participants from artisans, 10 participants from apprentice community and will use targeted selection method when selecting 10 tutors, 5 supervisors and 5 managers to participate in the study. This means that the study sample was made out of 50 participants that are representing the target population. This sample was derived from the target population of 642.

3.8 Data Collection Instruments

Data refers to the raw information that is collected with the purpose of being analysed, categorised and interpreted so that it make sense to the person that is reading it. Collection instruments refers to the tools used by the researcher during the data collection exercise so that

the data can be put together and be interpreted (Rubin, 2008). This study employed surveys questions, in-depth interviews and observation to collect needed data. The researcher saw an opportunity to use research paradigms that may complement each other, which is why decided on employing the mentioned combination of data collection instruments.

The researcher visited the School of Engineering with an aim to observe and see the setup of the school and able to talk from the reality point of view. After a visit of the school the assessor visited the workplace and had discussions with learners and mentors during the visits. The researcher had formal but not structured discussions with the stakeholders where he wanted to get a feel of the learners and the people who were working on the site about level of mentorship, and atmosphere if the learners were happy and the mentors were also happy to impart the skills to the future artisans.

3.8.1 Observation

Observation is a systematic **data collection approach**. Researchers use all of their senses to examine people in natural settings or naturally occurring situations. **Observation** of a field setting involves: prolonged engagement in a setting or social situation (Barbara and Kawulich 2005). Participant observation is the process enabling researchers to learn about the activities of the people under study in the natural setting through observing and participating in those activities. It provides the context for development of sampling guidelines and interview guides (DeWALT & DeWALT, 2002).

3.8.2 Interviews

Interviews is a process where the researcher engage with the participants which helps the researcher build the relationship with his participants in such a way that the participants may willingly give out more information that may be required. Interviews create a platform where the participants may engage on a dialogue about the topic in questions where certain myths may be cleared and facts may come up clear (Patton, 2005 and Seidman, 2006). Semi structured in-depth interviews were employed in this study, this method assisted in participants to share

their experiences freely in their own words moreover they are coming from the rural areas which might put them off if the researcher guide their answers to much.

The participants were given the interviews discussion points 3 weeks in advance so that they had the time to familiarise themselves with them and able to recollect their experiences about the topic in question when the interviews takes place. The purposive sampling technique was used by the researcher to collect data for the purpose of this research. Purposive sampling, also known as judgmental, biased sampling, is a form of non-probability sampling technique (Patton, 202, p.237). Non-probability sampling focuses on sampling techniques where the units that are investigated are based on the judgement of the researcher (Braunstein 1993; Hathaway 2004).

The researcher purposely chosen to interview 1 manager out of 4 managers, 2 tutors out of 4 tutors and 4 learners out of 10 learners participated in the study. The manager that was chosen was a maintenance manager who is very much involved in the maintenance of equipment that is refurbished and maintained by the artisans that are produced by the School of Engineering in Durban. Which means that he has a big invested interest on the way the artisans are developed by the School of Engineering as he is the end user. The researcher also selected tutors so that they would give their side of the story as they were involved in the teaching of these learners, they arrange workplace learning component, and they also plan theory and practical demonstration to the machine. Their experience was very important as well. The learners were purposely involved to the interviews because they were the ones who were being affected by the conditions in the workplace and the school their experience and opinions to improve were very much important. The researcher is using both quantitative and qualitative research design methods where the quantities are presented in tabular and graphical formats while qualitative data narrative, descriptive and emanates from interviews and observations conducted by the researcher (www.measuringu.com, March 2018).

(a) Advantages of purposive sampling

There are a wide range of qualitative research designs that researchers can draw on. This will help the researcher to achieving the goals of such qualitative research designs requires different types of sampling strategy and sampling technique (see Frankel & Devers, 2000a). One of the major benefits of purposive sampling is the wide range of sampling techniques that can be used across such qualitative research designs; purposive sampling techniques that range from homogeneous sampling through to critical case sampling, expert sampling, and more.

Whilst the various purposive sampling techniques each have different goals, they can provide researchers with the justification to make generalisations from the sample that is being studied, whether such generalisations are theoretical, analytic and/or logical in nature. However, since each of these types of purposive sampling differs in terms of the nature and ability to make generalisations, you should read the articles on each of these purposive sampling techniques to understand their relative advantages.

Qualitative research designs can involve multiple phases, with each phase building on the previous one. In such instances, different types of sampling technique may be required at each phase. Purposive sampling is useful in these instances because it affords a wide range of non-probability sampling techniques for the researcher to draw on. For example, critical case sampling may be used to investigate whether a phenomenon is worth investigating further, before adopting an expert sampling approach to examine specific issues further.

(b) Disadvantages of purposive sampling

Purposive samples, irrespective of the type of purposive sampling used, can be highly prone to researcher prejudice. The idea that a purposive sample has been created based on the judgement of the researcher is not a good defence when it comes to alleviating possible researcher subjectivity, especially when compared with probability sampling techniques that are designed to reduce such biases. However, this condemnatory, subjective component of purpose sampling is only a major disadvantage when such judgements are poorly considered, that is, where judgements have not been based on clear criteria, whether a theoretical framework, expert elicitation, or some other accepted criteria (Patton, 2002).

The subjectivity and non-probability based nature of unit selection (e.g. selecting people, cases/organisations, etc.) in purposive sampling means that it can be difficult to defend the representativeness of the sample. In other words, it can be difficult to convince the reader that the judgement you used to select units to study was appropriate. For this reason, it can also be difficult to convince the reader that research using purposive sampling achieved theoretical, analytic, logical generalisation. After all, if different units had been selected, would the results and any generalisations have been the same?

3.8.3 Survey Questionnaires

The researcher also saw an opportunity to collect data using different instruments as a means to guard against distortion. In this study, survey questionnaires, the researcher were self-administered by the researcher. The questionnaires were developed in line with the objectives of the study. The 93 questionnaires were self-administered to the participants. The self-administered approach was recommended by Sekaran and Bougie (2013), they believe that it offer participants opportunity to ask questions and points of clarification should there be a need. They were administered over the period of three months. The authenticity of the data being collected here is very important as the participant's feelings; personal experience should not be influenced so that when submitting the report is fair on both ends. The questionnaires was in line with Likert scale type questionnaire.

3.9 Data Quality Control

3.9.1 Cronbach's alpha

In this study, the reliability of investigative devices was measured utilising Cronbach's Coefficient alpha. Sekaran and Bougie (2010) pronounce Cronbach's coefficient alpha as a noted method to gauge internal reliability of research tools and it is based on inter-item correlations. When items are strongly connected with each other, this suggests their internal consistence is high.

3.9.2 Reliability

The two most important accuracy measures are reliability and validity. Reliability is defined by Sekaran and Bougie (2010) as consistency and stability of the measuring device used for research purposes. This is achieved by taking several measurements on the same subjects. A reliability coefficient of 0. 70 or higher is considered acceptable in research project. Several categories were tested for reliability scores and the results would be presented for consideration.

3.9.3 Validity

It is important to ensure that the research instruments used in the research project accurately measures what the researcher wishes to measure. Validity is defined by Bless, Higson-Smith and Kagee (2008) as a degree to which a research study measures what is it expected to measure. Best (2012) explains that data collected should be relevant to the objectives of the research project; and the findings should provide a complete picture which captures relevant issues of what is being investigated. Pre-testing of the questionnaire ensures that there are no challenges for participants when completing the questionnaire. Questions were written in a simple language and instructions were in a simple English to facilitate participants understanding.

3.9.4 Measurements

The scale that was used in this study is Likert scale. Likert scale is known as summative scale because of its ability to capture the answers from the participants in a concise format. Likerty scale responses are as per the table below.

Agree	Strongly Agree	Not Sure/Uncertain	Disagree	Strongly Disagree
1	2	3	4	5

3.10 Data Analysis Methods.

There are different types of data collecting methods in the research. Below are some of the methods that are used when a person collecting data. This study was mainly using the questionnaires and interviews and it proved to be sufficient to collect sufficient data to cover the points that are explaining the whole question of the perception of the quality of artisans produced by the School of Engineering Durban campus. The researcher also used observation to collect certain data as a means to strengthen the data that was collected following traditional methods guided by quantitative approach. This approached allowed the researcher to be in the situation and get an insight which quantitative approach could not obtain. The researcher had to be in the work situation to be able to sense the feelings, the atmosphere in which novices are working whether is during the institutionalized learning or in the workplace phase. The researcher had to take photos, conduct unstructured interviews with specific people to get the

while doing all this the aim was to make sense of what was happening so that he may be able to describe the situation as conducive and sufficient for learning to take place for future skills utilization (Polonsky and Waller, 2011). The researcher went to the real life situation and collected certain data so that it may complement what was collected using distance methods of traditional approach.

3.10.1 Inductive Data Analysis Approach

The purposes for using an inductive approach are to (a) condense raw textual data into a brief, summary format; (b) establish clear links between the evaluation or research objectives and the summary findings derived from the raw data; and (c) develop a framework of the underlying structure of experiences or processes that are evident in the raw data. The general inductive approach provides an easily used and systematic set of procedures for analyzing qualitative data that can produce reliable and valid findings. Although the general inductive approach is not as strong as some other analytic strategies for theory or model development, it does provide a simple, straightforward approach for deriving findings in the context of focused evaluation questions. Many evaluators are likely to find using a general inductive approach less complicated than using other approaches to qualitative data analysis (Thomas, 2006).

3.11 Ethical Considerations

University of KwaZulu Natal research procedural requirements were met by obtaining ethical clearance and permission to conduct the study. A letter of consent was affixed to the questionnaires for the participants to read through and sign it in case they are willing to voluntary participation. It was clearly explained that participation to the study was voluntary and there were no negative consequences should the participant chose not to take part in the study. All information about the study was given to the participants with regards to the objectives of the study. The participants were also assured that whatever information they would give it was only for the study purpose nothing else and it would remain confidential nobody else except the researcher would know about who said what. The participants were also informed that by participating in the study there were no financial gain involved. Furseth and Everett (2013) emphasise the significance of obtaining consent to take part of the partakers before data is collected.

3.12 Conclusion

This chapter outlined the method employed in conducting the study. It shows break down of the specific methods of collecting data, their advantages and disadvantages, it outlined the population, sampling method and analyzing data. The next chapter will presents outcomes of the research.

Chapter Four: Data Analysis and Interpretation of Findings

4.1 Introduction

On the previous chapter the researcher has introduced, discussed and defined the ways used to collect data. This section is mainly focusing on analyzing, defining and interpreting the findings. The questionnaires were self-administered which saved the researcher from stamps and certain logistics has he chose the areas out of the work environment. The outcomes of the research are organized in the charts, tables and symbols formats etc. the questionnaires were self-administered to the apprentices, tutors, artisans, supervisors, managers of Transnet in Durban only. The response of 46 % was received against 50 issued questionnaires.

Data analysis is the process of scrutinising, categorising and interpreting collected data when it is in its raw format with an aim of organising it into meaningful information that may be utilised by the society to formulate certain programs. The data collected via the qualitative approach will be analysed using thematic analysis approach. This approach involves the identification of phrases in the data, and reports them as discoveries (Stringer, 2007). For

analysing the data in detail it is important that the researcher consider thematic as it comes with certain advantages where the content is important from the participant's point of view.

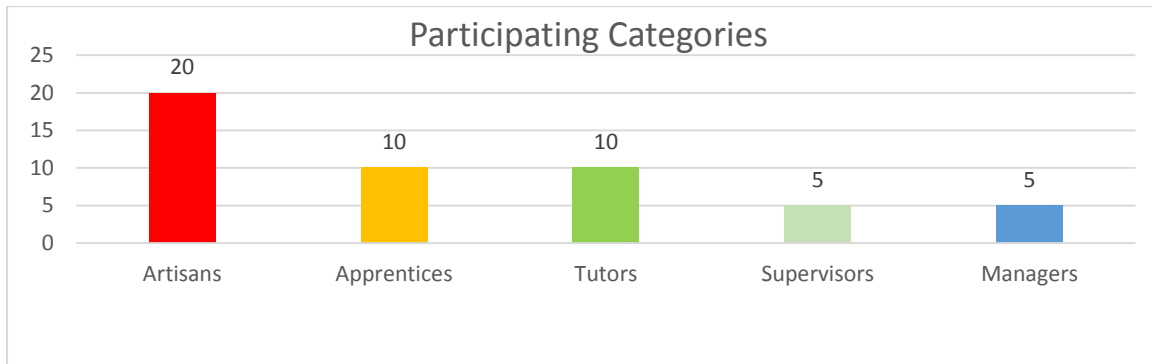
The participants also raised certain anxieties at the School of Engineering in Durban such as aligning the curriculum to the latest technology such as improving PLC equipment, Electronics and CNC. The production of quality artisans was at stake. For any country to gain competitive advantage its human capital resource should be blessed with skills which are employed on the production lines which are in turn produce the goods and services quicker but effective and efficiently (Becker, Thurow and Reich, 1983). One of the things considered are the profile of the participants. Personal information was used for analyzing demographic data like race, gender, education level which is not that much significance but it may have an impact on how people adapt and accept changes that came with the new dispensation hence the craftsmen training has been reserved for certain racial groups in South African context. The descriptive statistical process was used to summarize and clarify investigation data in a more understandable way. Zikmund (2013) stated that descriptive statistics can be used to summarize and explain research data in a simple and comprehensive manner.

4.2 Participants Profile

This section will show descriptive statistics in line with the shape of the people purported to participate on the study. The respondents were requested to give their individual demographic information for the research purposes only. The demographic data requested was as follows: Age, Gender, Position, and Experience in the position and Qualifications. This information is presented in tables and charts for descriptive purposes only.

4.2.1 Sector

Figure 1: The sample consisted participants from five main sectors (Apprentices, Tutors, Artisans, Supervisors and Managers)



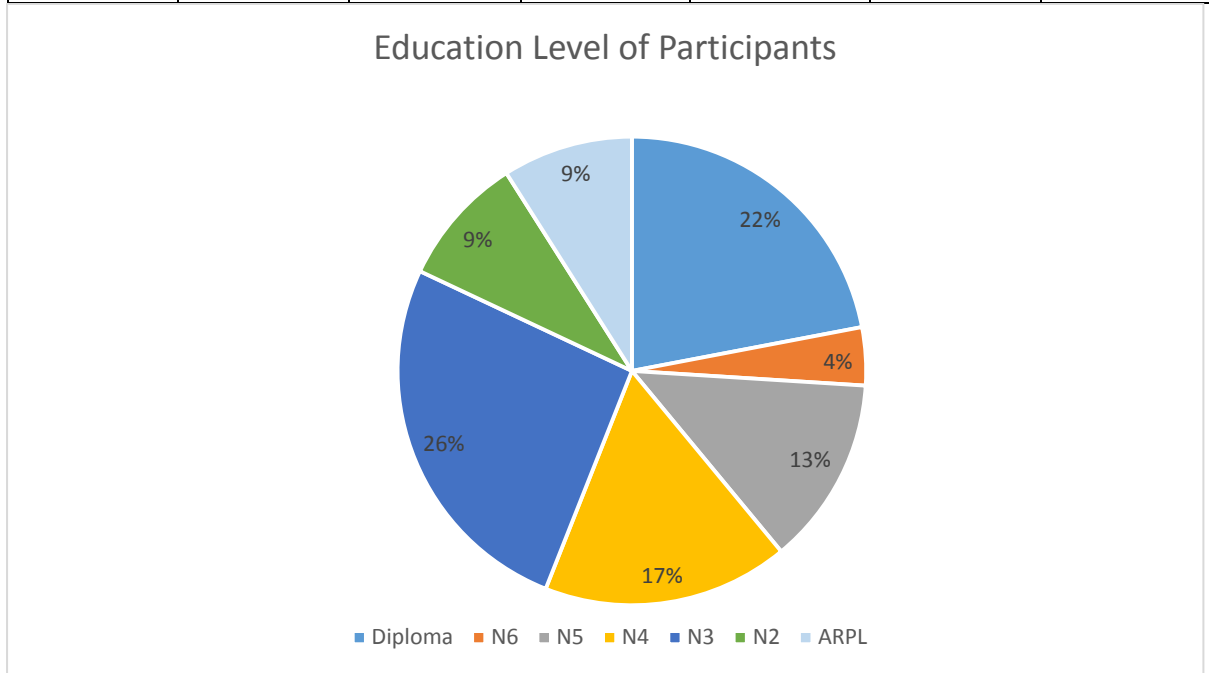
The figure above shows the number of people per sector the researcher desired to include in the study for fair representability. The represented population was 642. Artisans, apprentices, tutors were more represented than supervisors and managers. This is a manifestation of hierarchical organigram of our organizations the people supervising others are always lesser in their numbers. The data received from the personnel department revealed that artisans and apprentices were high in numbers as compared to other occupational categories. The apprentice inclusion was highly significant hence the challenges of apprentice learners from different artisan development institutions complaining about the lack of alignment to tutor competency levels, workplace exposures, curriculum contemporarily. Apprentices and artisans they have firsthand experience about the challenges in the school. Artisans, supervisors and managers represented the workplace components. In other words they are the buyers of the product that is produced by School of Engineering which are the people who are being trained known as artisan when they finish the training. Their opinion was very important as they also participate on the training of these apprentices by providing them with workplace exposure and show them the real skills in the real work environment as compared to the simulated workplace. The supervisors and management are the voices of the customer where both school and operation are building the value of the brand by, (Schultz, 2000).

4.2.2 Qualification of Participants

Table 2: below illustrates the qualifications of the participants by category

	Artisans	Apprentice	Tutors	Supervisors	Managers	Total
Diploma	0	1	1	0	3	5
N6	0	1	0	0	0	1
N5	0	1	1	0	1	3
N4	0	2	1	1	0	4

N3	3	3	0	0	0	6
N2	0	1	1	0	0	2
Other	ARPL	ARPL	0	0	0	2



The table and figure above represented the qualification of the participants. The table presents the numerical values while the graph presents it in percentages. There are five participants with national diploma qualification. Eight participants has a higher certificates between N4 and N6. Eight of them were within the further education and training category which is between N1 and N3. The two of the participants fell within a category of Artisan Recognition of Prior Learning (ARPL). This category represent people who does not have a formal education but learned the trade through experience while working with qualified artisans. In South Africa this is one of the recognize route to obtain an artisan status. There is a lot of employees who have managed to obtain artisan status via this method. Recognition of Prior Learning is a method of presenting a chance to the semiskilled employees of our country who have been working with artisans for more than four years and they have gained skills and experience required, that may help them pass a national examination for apprentices, which is called trade test to become artisan. An Artisan is one of the well-recognized way of exuding that you are able to do things with your hands like modifying, repairing, improving certain products using the skills you gained either through experience or apprentice. The researcher wanted to ensure that different categories of the people who have been part of the artisan development journey in their lives participate on the study as to add their voice.

(November, I., Alexander, G., van Wyk, M.M. and Bereng, T., 2009) state that prior to the first democratic elections in 1994, historically disadvantaged populations, Africans, Indians and

Coloureds in South Africa were subjected to Eurocentric learning content that discriminated against any validation of examples relevant to their lives. It has been difficult even to have your certificate from an institution which was outside this centric to be recognised. The recognition or prior learning was also outside of formal institutions as they are within the workplace formation.

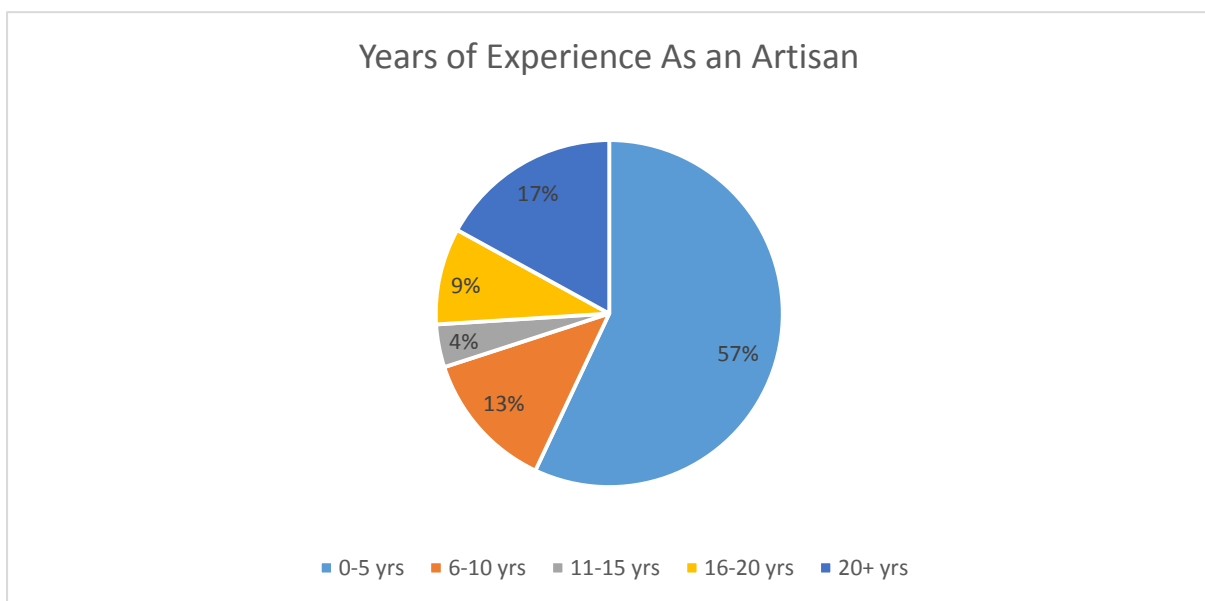
RPL has endorsed by post-Apartheid legislation and structures, like the South African Qualifications Authority Act, 1995 (SAQA) and the National Qualifications Framework Act, 2008 (NRF) to recognise knowledge and skills learnt from experiences through informal settings argued by (November, Alexander, van Wyk and Bereng, 2009).

4.2.3 Work Experience

Table 3: below illustrates data on the length of service for each category of participants.

	Artisans	Apprentice	Tutors	Supervisors	Managers	Total
0-5	0	10	1	1	1	13
6-10	2	0	0	0	1	3
11 – 15	0	0	1	0	0	1
16 – 20	0	0	1	0	1	2
>20 yrs.	2	0	1	0	1	4
Total	4	10	4	1	4	23

Figure 2: Years of experience as an Artisan



The table and figure above represents the how long they have been working for Transnet and their specific experience as artisans which give them a better insight of the artisan development

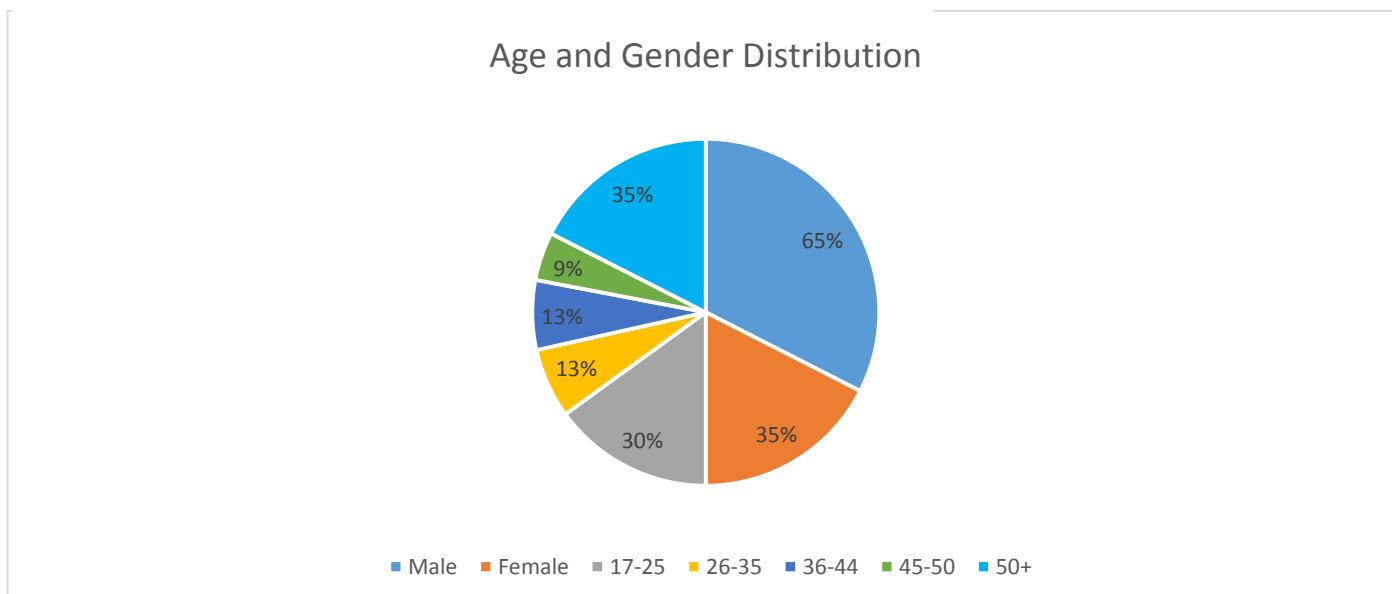
journey and their challenges. The table shows the normal numbers while the graphs shows it in graphical format. About 57% of the participants had between 0 and 5 years' service with Transnet. 13% of the participants had been working at Transnet Engineering for 6 and 10 years. About 4% of the participants have been employed by Transnet Engineering for between 11 and 15 years. While about 8.7% worked between 16 and 20 year for Transnet Engineering. 17% have worked for more than 20 years at Transnet Engineering either as artisan, Tutors and Managing maintenance services department where artisans are employed in other words they have 1st hand encounter with artisans that are produced by School of Engineering in Durban. The importance of service on this study is to do with the number of years a person has encountered with the artisans as learners during the OJT or as full-fledged artisans after completing the training to be able to identify the weaknesses newly qualified or those in the vocational technical school at the moment stated (Cochran-Smith, M., Lytle, S. 1999)

4.2.4 Gender shape of the participants

Table 4: below shows the age and gender of the respondents.

Age Profile	Gender		Total
	Female	Male	
17 - 25	5	2	7
26 - 35	2	1	3
36 - 44	1	2	3
45 - 50	0	2	2
>50	0	8	8

Figure 3: Age and Gender Percentage Distribution



The respondent participants' majority was male at approximately 65%, this shows a high skewed distribution of gender toward male. The gender representability at artisan or technical engineering sector is still a challenge at Transnet Engineering. The employees that a researcher spoke to about this they sighted the history and dislike where female employees would always prefer office bound work where they are not going to be dirty as the artisan career lead you through the dirty field. The female respondents were at 35%. The participants' ages was represented as such that 30.4% was between 17 and 25 years. While 34,8% participants were over 50 years and for that matter all of them were male which still emphasize that the technical fields is dominated by male. Transnet Engineering should have an anxiety when it comes to its aging workforce in this area as the skill that these employees will retire with is very important or any organization if it is going to see through the future. It was important that different age groups are represented because their experience in life career differs. There is a learning from both ends of the continuum. It was interesting to see that between the ages of 17 and 35 majority of respondents were female at 30.4% against the 13% male respondents, this illustrated that there was a gender transformation that is taking place at Transnet Engineering. The future of the organization is balancing if you look at the figures. The age and experience goes hand in hand in most of the time. Experience is a function of number of years spent doing the particular activity or function. The skill is a function of practicing something over and over until it innate in your mind and your hands. When you do it comes like natural. The distribution of gender in this study still shows that artisan related careers are mainly associated with male although organizations are showing such a willingness and efforts to bring in females in this sector we still have a long way to go.

4.2.5 Statistical Analysis

For organization and explanation of data in a more simple and comprehensive way the statistical analysis was employed. Statistical computer software IBM 2015 was employed to analyze and illustrate the outcomes based on the descriptive statistics. The IBM 2015 simplify the data for the researcher to analyze and arrange the outcomes accordingly. According to Boeree, C.G. (2005) descriptive statistics are ways of summarizing large sets of quantitative (numerical) information. He further stated that, if you have a large number of measurements, the best thing you can do is to make a graph with all the possible scores along the bottom (x

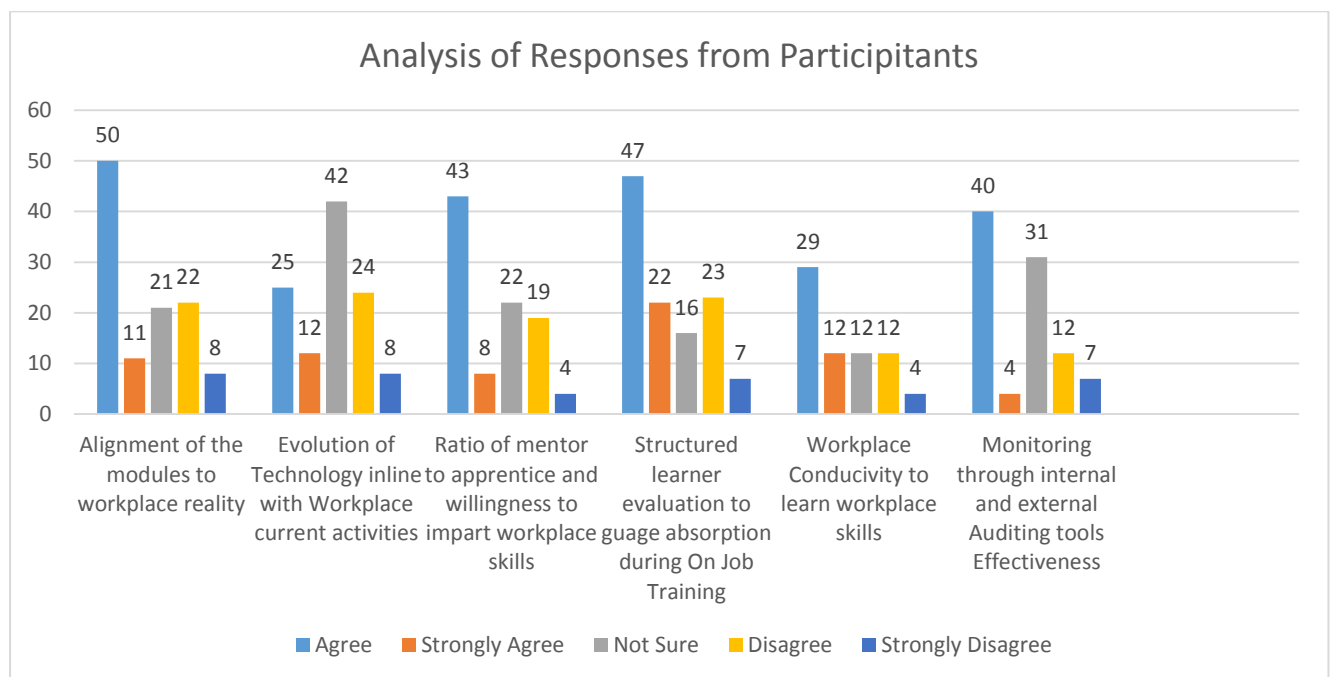
axis), and the number of times you came across that score recorded vertically (y axis) in the form of a bar.

4.2.6 Participants’ Perception of the School of Engineering and Apprenticeship Development

This area concentrates to the perception of the participants of the apprenticeship development at School of Engineering in the Durban campus. Tables and graphs are employed in explaining the answers from participants in a more understandable and rational way.

The graph below present the brief summary of the perceptions of participants on the apprenticeship development at School of Engineering in Durban campus.

Figure 4: Analysis of Responses from Participants



The figure above depicts how the participants perceived the quality of learning and teaching in line with the prescript of the artisan development measurement of quality. Participants agrees that there are alignment on the modules that are used for learning in the school with workplace reality. The area shows low levels of agreement was technology evolution. In the eyes of the participants there is a need to invest more on the latest technology as only 25 statements were congruent. It is also noticeable that there was a high number of participants who were not sure

about certain statements which means had they been familiar with the school of engineering their opinion may have lean towards more agree or disagree.

The researcher sees this as an opportunity of learning. There is a need to create an awareness throughout the organization with regards to what the school is doing in terms of capital investment, the processes involving the school so that it remains relevant to the current activities in the industry and keep abreast with new technology so that the artisans that are being produced are relevant and competent so that the perception of poor quality of artisan may be addressable. There are six key factors that are required to fulfil the requirement of quality in artisan training in the contemporary business world. Those are correct modules in line with the curriculum which in this case are mainly theory and practical components based on machines being used in the workplace.

Mentor apprentice ratio where the experienced artisans shows the learners how to do things in the real world. This mainly happens during the On Job Training. The willingness of the artisans to work with apprentices holding their hands make the apprentice experience the reality of what being artisan is all about. This is a major component in an apprenticeship. When the learners may not get enough and suitable OJT all is not well because the apprentice may not practice what she/he would be confronted with when she/he is employed.

Learner evaluation during the OJT. This statement requires that the learner be evaluated by supervisors and experienced artisans. 69 participants agrees that the evaluation does take place. That one is a positive to fulfil the fourth requirement for quality artisan development.

Workplace has to be conducive for apprentices to learn the real skills of the workplace. This is also an area of concern the responses although they showing positive but their numbers are low. This also shows an area that requires improvement. This represent an opportunity to further investigate reasons behind the low agreement numbers. Some of the artisans may not willingly show the apprentices the workplace processes.

For the apprenticeship to thrive one of the key aspect to be fulfilled is ensuring a continuous monitoring using internal and external auditing if all requirements are met. When this is happening the chances of identifying negative deviation and make early corrections are high. It is important that organizations are in line with this. There is more participants saying the monitoring does take place, but there are also 31 participants who are saying they are uncertain which also present an opportunity to educate all people about these monitoring tools. Had participants sure about all the criteria a clear responses whether in agreement or disagreement

was going to be available. The gap between the School of Engineering community and the workplace community has shown itself in the responses. The participants from School of Engineering has shown that they have an exposure on both the school and workplace as they visit the workplace frequently while involved in On Job Training component and tutors also visits the workplace frequently when doing monitoring visits to ensure learners are receiving the correct exposure and get feedback from the learners and mentors about the conduciveness of learning and behavioral from mentors about learners. The artisans, supervisors and managers they were not sure most of the time with the certain statement to do with the operation of the school. Since the school is an integral part of the operation it is important that both worlds are somehow married as they need each other.

4.2.7 Challenges of Apprentice Training in School of Engineering Durban Campus

Table 5: Percentage vs Rate recurrence

	Rate of Recurrence	Percentages
Module alignment to Workplace	30	27%
Technology from School aligned to workplace	32	29%
Mentor ratio and willingness to impart skills	23	21%
Structured Learner Evaluation During OJT	30	27%
Workplace Conducive to learn workplace skills	16	20%
Monitoring Quality of Education	19	20%
Total	150	100%

The 27% of the participants felt that modules needs to be aligned to what is available on the workplace. 19% of the participants were not sure about this question. 29% of the participants felt that School of Engineering Durban Campus was not doing enough to align itself with technological development out there. There are 38% of participants that were not sure about the measurement. The feeling is that, this is affecting the quality of the learners as they seem know nothing when they are confronted with a technology related problem in the workplace while they have spent 3 years in the school. The expectation from the client is that a research should have been done to know what type of technology is out there in the market and align the training aids equipment to prepare learners better for the workplace. About the mentors

availability and willingness to impart the workplace skills, 21% felt that not enough mentors are willing to share their skills with apprentices.

The mentors feel that learners will take their jobs as they seem to be learning with latest technology. The other mentors feel that by showing apprentices workplace skills they should be compensated for it and they feel not motivated to do it for free. The 27% of the participants feel that, there is a lack of structured evaluation of learners during workplace exposure. 20% felt were not sure they could not agree or disagree. 20% felt that the workplace was not conducive for learning actual workplace skills due to production demand that are placed on artisans. It has to be remembered that apprentices are learning. When there is schedule time for producing a product it becomes very hard for the learners to work at the pace of an experienced artisan. The production targets are affected and when that has happened artisan have to answer not an apprentice. It is a cash 22 situation. The measurement of monitoring the quality of training given to the apprentices by School of Engineering Durban Campus, 20% of participants felt that there was not enough monitoring whether the training of apprentice institutionalized or during workplace was taking place as per the quality standards that are lay down. The 33% of the participants were not sure about the measurement. The question of the study has somehow answered by this section.

The next section presents study questionnaires in a table format with answers from the participants.

4.3 The Study Interview Questionnaire.

The interview questions is one of the methods that are used by the researchers when they are collecting data for their study. The interview questions are used by the researcher when is meeting the participants face to face or by using telephone.

The interview questions may follow a structured or informal interview approach. The aim is to supplement certain data or trying to understand or clarify certain specific issues in the research. Structured interview questions is a method where each participant is asked same question in a pre-determined format. The interviewer leads your answers towards a particular direction. The semi-structured interview methods, is a method where the interviewer does not strictly follow a list of questions. The researcher asks more open ended questions allowing for a discussion to be open and the respondents to be free.

The researcher felt that there was no need to have structured interview questions hence the disadvantages outweigh the advantages. The other reasons were based on the method was using. The questions were emailed to everybody and explained on the phone and face to face to some of the participants since the site of the study was one and closer to where the researcher was working as well. The researcher chose to use semi-structured interviews. The semi-structured interviewing method was used in this instance. According to Bernard (1988), semi-structure interviews can provide reliable, comparable qualitative data. The questions that were asked from the maintenance manager was as follows:

4.3.1 Advantages of Semi-Structured Interview Questions

- a) Respondents are free to express themselves.
- b) There is no biasness towards a particular opinion.
- c) The research has no chance of influencing the respondents' answers.
- d) Questions may be clarified easily as well.

4.3.2 Disadvantages of Semi-Structured Interview Questions

- a) Analysis take a lot of time because participants responds the way they feel so wish.
- b) It take long to carry them out as well.
- c) Researchers requires specialised training.
- d) Answers may not be fully completed as some participants may have busy schedule.

4.4 In depth questionnaires

4.4.1 How do you see the structure of the job training for our artisan trainees?

Respondent one was a maintenance manager who stated that the time trainees was spending on the job training was not enough to cover the equipment's that are available in the factory. And also he felt that it should be remembered that the maintenance environment mainly work on break downs and plan maintenance which made it difficult that the apprentices are able to get exposure to certain specific machines. Sometimes the trainee may not be exposed on certain equipment until his OJT time is finished. He goes back to the school without learning anything

on it. The maintenance manager also felt that the tutor needs to visit the workshop areas more often to remain relevant on what was happening in the workplace and teach the learners something relevant to the industry which is expected to absorb these learners when they finish.

4.4.2 What would you like the school to improve so that the quality of artisans they are producing are in line with your need as a client?

More time needs to be spent in the workshop by trainees. The other challenge is that the learning material needs to be reviewed in line with the changes in the work environment so that the learners remain relevant to the work we do as a company. The other big challenge is that learners are not disciplined as during the time we were doing apprentices. During the working times learners are always using the cell phones. This is a major threat to producing the quality artisans as the learners are not concentrating on what their mentors are doing, remember apprenticeship is learning by imitating somebody while observing you. The questions that were asked from the mentor were as follows:

4.4.3 How do you see the way we train artisans now and the time you were doing apprenticeship?

Answer: The time for an apprenticeship during our time was more than the time you are taking now. A lot of time was spent on the workshop than in the school. Today it is the other way round. There were no cell phones, which distract people. Firing an apprentice was much easier and everybody was serious about the chance he got to do an apprenticeship. People were disciplined as compared to the youth of today. The crux of becoming an apprentice is to want to learn the skills which mainly is learned by doing as compared to putting a theory at head that will not work for you. Problem solving skills are learned by experiencing challenges in the work environment.

4.5 The questions that were asked from the tutors were as follows:

4.5.1 What is the challenging thing to produce the best artisan that the industry is happy to have?

Answer: The challenge is the apprentice tutor ratio, sometimes it is difficult to have a quality time with all the learners in your workshop because of the numbers at your disposal. The machines we have in certain areas are not enough. For the learners to learn the skills they require a lot of practice. With the numbers of learners we always have it is difficult for all of

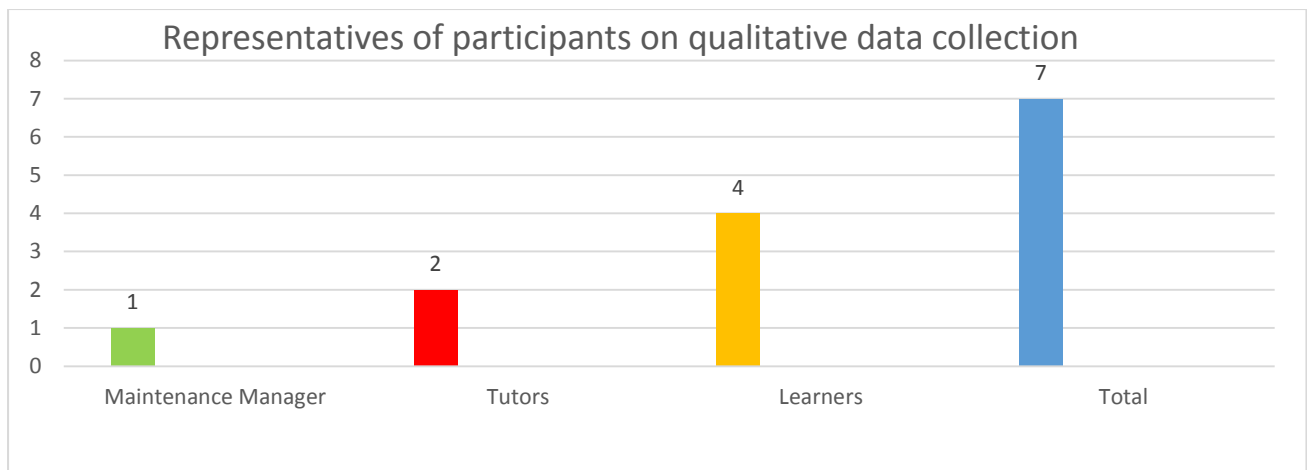
them to have ratio of 1:1 in terms of apprentice machine ratio for them to practice. The background of the learners as well play a big role on the quality that comes out sometime. Most of the learners are starting almost everything from scratch as they never been exposed at TVET or any place. The setup of the curriculum is also contributing because it only allows few days in the workshop as compared to the old system where workshop time was more than the classroom times. Changes in technology in the workshop are a big challenge. School is struggling to keep pace with the technology because it does not have money to buy every version of the equipment that is available in the market. Remember schools are a cost to the company as compared to businesses that are generating income. The concentration levels of the learners are also a problem because learners are always on the cell phones. This make our work much hard. The solution is that cell phones access of all learners be not allowed during the normal working hours only access during tea lunch times, that was one of the recommendations from tutors. The tutors see the access to cell phones as a distraction and a cause of lack of concentration on the apprentices. This may be partly a cause of learners not being able to solve design and repair problem during the real world. This may also translate to a poor quality of the artisans that School of Engineering is blamed for.

4.6 The question that was asked from the phase 3 apprentices sampled was as follows:

4.6.1 What were factors that do you think affects the quality of the training that you are getting from School?

Leaners felt that the modules that they using were too old although 70% of their content was still relevant but the 30% that is outdated has an effect on the way they are being trained and their performance when they are at the workplace as one thing that they may not do is affecting delivery of the service to the client. The alignment of the modules to the machines is also affecting them, when are in the workplace they start learning new things that never got an exposure before. They felt that OJT was also not enough to prepare them for the real world. They also felt that technology was also a challenge not enough technological imbedded equipment. That affect their performance when they are employed because they see these equipment 1st time and not in line with the practicing and simulated workshops.

Figure 5: Represents Participants Interview.



The figure above depicts the sectors and the number of people who participated on interviews. Each category represented a particular interest. Maintenance manager represented an employer and the end user of the product. Tutors represented the supplier of the product. While learners represented the processing of the products in terms of the right inputs etc. The maintenance manager agreed with the data collected by using questionnaires where the majority of the responded felt that the time spent in OJT (on job training) was not enough. This means that there was agreement between interviews and survey questionnaires when it comes to this area. Learners discipline came out clearly as well during the interview with the maintenance manager. Learners of today are inundated with a lot of technology which sometimes disturb them on concentrating to what they came here for.

This area also seem to in congruent with the results of survey questionnaires as they also find that discipline of nowadays learners is questionable as compared to yester years. The number of learners to one tutor again emerged when the investigator was interviewing the tutors. Tutors felt that the number of learners is more than they can support some time which may also become a concern of quality.

Learning material came out during an interview follow up discussions as something that the school needs to pay attention. This is also showing agreement with what was revealed by the survey questionnaires under quantitative data collection and analysis. Curriculum it was revealed that it needs some attention. When the learners were interviewed they felt that the modules needs to be updated. They felt that OJT days was not enough? They also felt that not enough technology fitted equipment for simulating during practice time. When they are in the workplace they find it difficult to emulate what they have learnt. The opinion of the

investigator is that there was a complimentary findings both from survey and interviewing sessions with the participants.

4.7 Visit to the School of Engineering by the investigator:

Due to the exploratory nature of qualitative data collection approach, the investigator decided to visit the School of Engineering where learners are being trained to verify what has been said by the participants during survey questionnaires and during in-depth interviews. (Monette et al 2010), praise qualitative methods with the byline of abstraction and generalization. (Polonsky and Waller 2011), states that qualitative data collection approach is credited with giving the researcher an opportunity of insight, visualization, pictures of the real situation and an opportunity to ask added questions of clarifications in areas where the investigator may not be sure of something (www.research-methodology.net, 10 March 2018). Qualitative data collection approach gives the investigator opulent data with regards to real life situation about what is being investigated (Polonsky and Waller 2011). They further argued that there main two methods that are prominent in the business world and loved by the researchers, interviews and observation data collection approaches. Qualitative approach look at the holistic view of the context of the investigated problem (www.onlineqda.hud.ac.uk 10 March 2018).

The visit to the school by the investigator took place in March 2017. The researcher did not want to disturb the normal operation of the school. He requested a permission from the Campus Manager Mr. Gavin Gallichan. Gave him the reasons why he want to visit the school. While the learners and tutors were doing their normal duties whether in classroom teaching of workshop practical component learning. The investigator came through and introduced himself to the campus manager. The visit happened on the 8th March 2017 at 9h30. The visit was planned to start with seeing classroom in which the theory part of the apprentice learning was taking place. The campus manager gave investigator a tour of the classrooms. There are six classrooms, one manager's office, five fully furnished tutor offices, kitchen, mass room with ovens and fridges for learners, ablution facilities for learners and one toilet dedicated for people leaving with disabilities. In three of the classroom there are hydraulic, pneumatics, computers and PLC equipment respectively. The other three classrooms were being shared by the tutors for any lessons planned for the day. The researcher requested a permission to take photos and guaranteed the campus manager that the photos was only for research purposes only nothing else which the campus manager interestingly gave the permission. In two classrooms there was

a group of about 15 and 12 with a tutor respectively. They were being taught pneumatics and plc technology.

The next tour was a tour of the workshop. The workshop is big and has two mezzanine floor on both ends and the middle area is used mainly for practicing with equipment modules. There were 32 learners inside the workshop. There was 10 learners who are learning mechanical fitter trade, 20 learners who are doing millwright trade and 2 learners who were doing bridging programmer to become artisan through Artisan Recognition of Prior Learning for mechanical fitter.

Figure 6 Showing the School of Engineering Workshop



Figure 7 depicts DTI alignment table



The attached two figures above are showing the workshop in which learners are doing both theoretical and simulation practice component of their learning. On the right hand side of the workshop view that is where hard core of the learning for fitters and millwrights takes place. Millwright and Mechanical Fitters are both specializing on machine mechanics or repairs. Mechanical fitter only work with mechanical side of repairs while millwright is a skill which gives a person knowledge of doing both electrical and mechanical repairs to any equipment in specific industry. On the left hand side of the workshop it where the stripping, checking, measurement, processes training is taking place. The DTI, Engines, Gearboxes, pumps, motors is set up. When there is something broken on the left hand side the learner go across to the right hand side designs it, shape and come and fit on the left hand side.

There are five DTI alignment equipment modules, five V-Belt equipment modules, 16 motors and pump fittings, and one big modern pump station. The campus manager told the researcher that there was not enough of certain equipment due to financial challenges. The investigator asked if there was a set standard on learner machine ratio, the campus manager stated nothing of such but there are good practices from other industries and sometimes they use that as guide. For Metal Engineering and Related Sector Education and Training Authority (MERSETA) industries they recommend 4 learners per machine where learners practice time is set at 2 hours in turn. That means that while one learner practice the other 3 are watching. When the 1st learner is finished his time the next one comes in. The biggest challenge was that all the learners in the workshop were supposed to do V-Belt, DTI alignment and pumps. With the number of equipment available there were challenges for practicing certain skills. The observation confirmed the survey questionnaire findings with regards to certain equipment and technology.

The interviews, survey questionnaires and observation are confirming the challenges with regards to issues about technology and the sufficiency of equipment modules. One issue to be confirmed during the observation was to check the training registers with regards to on job training (OJT) days compared to the complaints from maintenance manager and tutors. The researcher randomly picked 10 learner files, to check OJT days. For the third phase the number of on job training was 100 days while second phase was 40 and 1st phase only 21 days the learner was required to spend in the workshop. Everything was the same for all the learners file picked and checked. This as well is confirming the survey questionnaires as well interviews. If we remember the objective of enough OJT measure there was a negative responses from almost all participants. This means real the issue of on job training needs special attention if we need to improve skills of the artisans at Transnet.

Figure 8 showing certain technology equipment.

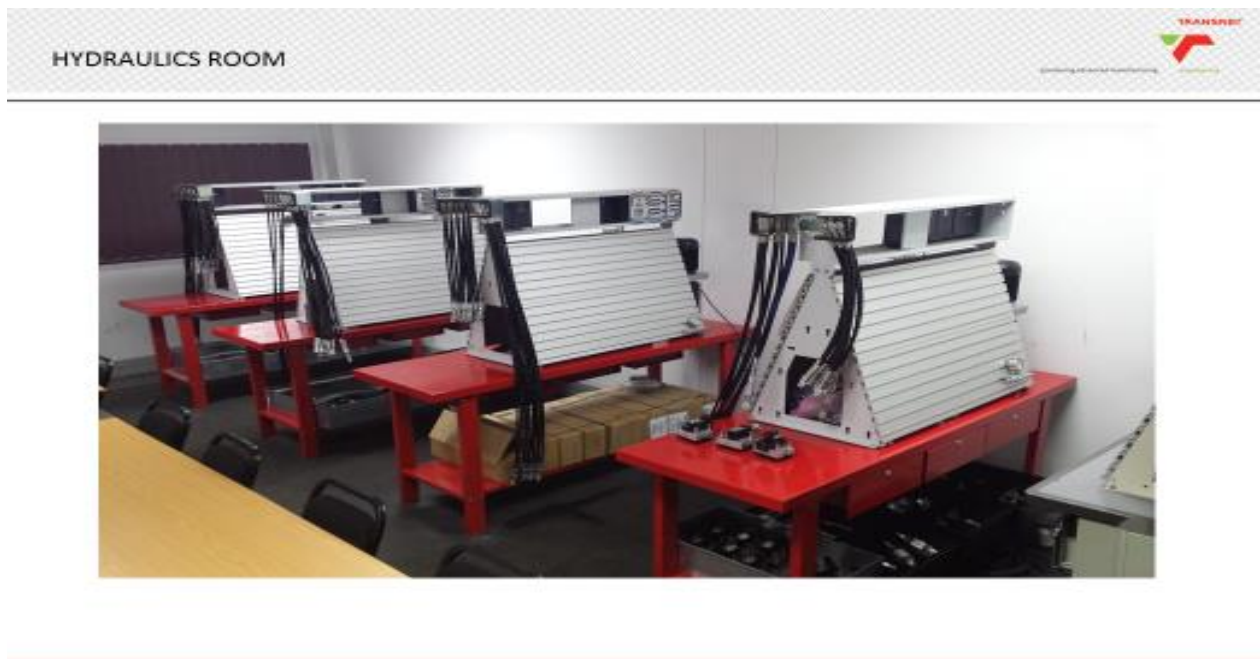


Figure 9 Showing Pneumatics Equipment inside a classroom.

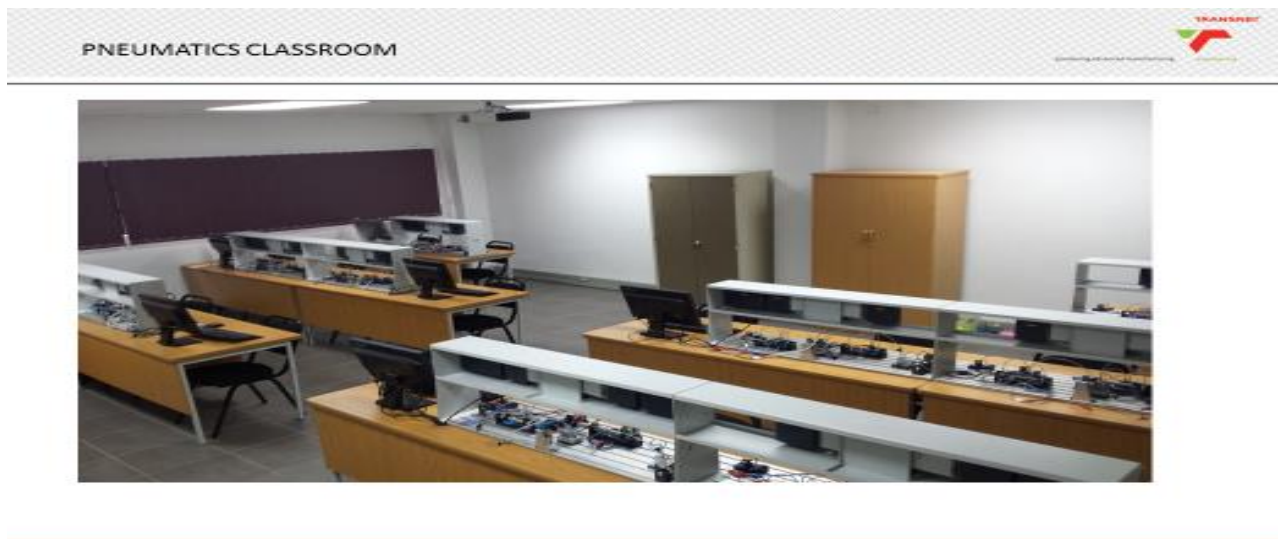


Figure 10 Showing PLC Equipment inside one of the classroom.

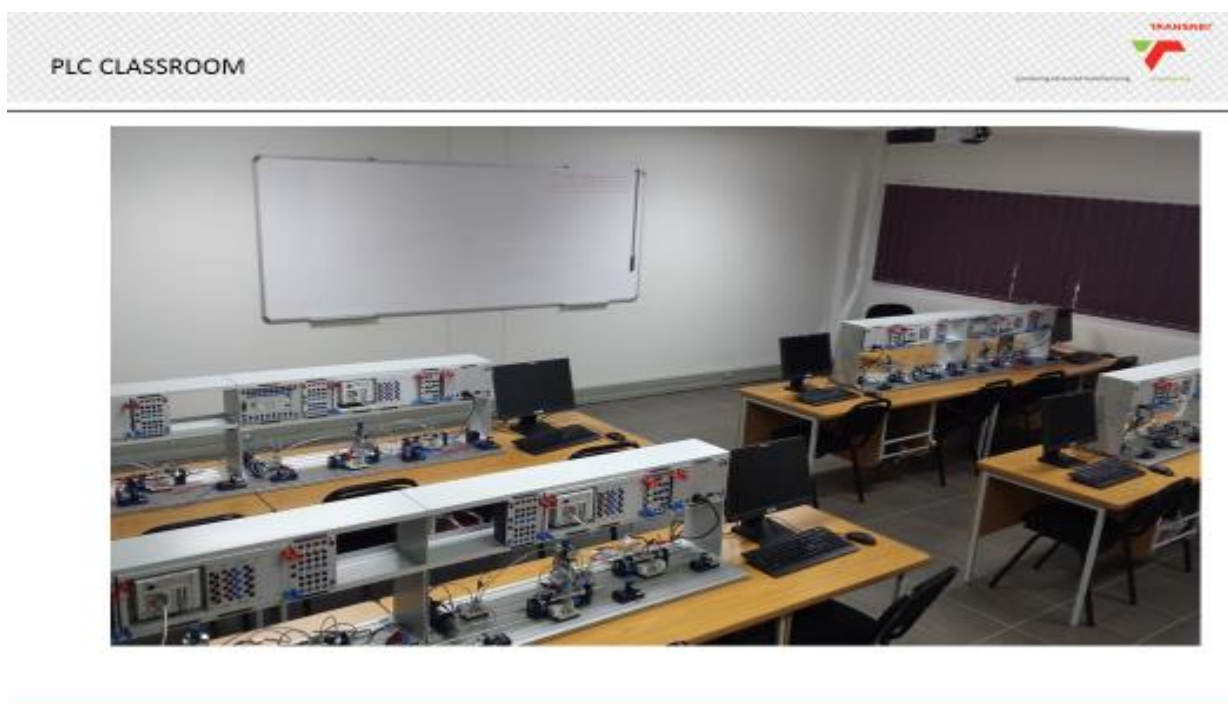


Figure 8, 9 and 10 are showing the available technology in the school. What was noticed during the observation visits is the unavailability PLC fault finding panels? The tutors and campus manager agreed that those panels were not available due to lack of budget. When asked how the learners were able to learn such skill they were mitigating the challenge by outsourcing that part to other colleges. It was clear that the technology's unavailability was about 1% of the

whole curriculum which means that it should not have a negative impact on the skills of the artisan produced at the school. The other good thing was a provision of outsourcing what the school did not have as a mitigating measure.

4.8 Common Issues to the Journey of Producing Quality Artisans by the School of Engineering:

4.8.1 Common Issues Raised by the participants

- a) Time of On Job Training is also collaborated by survey questionnaires.
- b) Equipment to train artisans not adequate, also corroborated by survey questionnaires.
- c) Technology in the market is always changing leaving schools behind corroborated by survey questionnaires as well.
- d) Learning material outdated was also raised by apprentices also corroborated by survey questionnaires.
- e) Learners always in their cell phones during the sessions whether is during OJT or session with the tutors.

The researcher noted the issues raised by different sectors during an informal interview sessions with the participants. The concern that the researcher has was the human rights issues in line with students being reached by their relatives in case there are emergencies in their families. The tutors came with mitigation saying that the school has telephone numbers that are available for them to take to their relatives and the staff is available who may convey a message to the learners. The majority of respondents felt that the number of time spent on the workshop was not enough which means that preparation of the apprentice for workplace is not getting enough attention and the learners themselves are not able to receive enough and relevant skills.

4.8 Summary

This chapter presented, interpreted, and put all the findings according to their specific sections that were utilised in the questionnaire. Relational approach was used to draw conclusions about the confirmation of the hypothesis or denouncing it. From the data collected majority of participants has denounce that the artisans produced by the school of engineering in Durban were of a poor quality. The participants felt that the school alone especial in the training of artisans may not be able to do much alone, they suggested that training institution and working

world both areas should work together as they needs each other if want to produce good quality of artisans.

The researcher is happy that the research questions and objectives were answered and it became very much clear that both world needs to work much closer to achieve better results. The researcher has no doubt that if the working world can come closer to the skills development world dual benefits for the whole nation may be achieved. It has to be remembered that learning institutions prepare and mould the learners who in turn work in the businesses to produce goods and services that are being sold to the market which forms part of the GDP and economy of the country. When these artisans are not good enough learning institutions are blamed for not producing the right skills for the absorption by the businesses. On the other hand learning institutions are complaining that businesses are not telling them what skills are required and are not showing interests on the human resources development of the country. Conclusions and recommendations for this study are presented in following and the last chapter

Chapter Five: Findings, Recommendations and Conclusion.

5.1 Introduction

The study was investigating the perceptions of clients with regards to the quality of artisans that are produced by the School of Engineering Durban campus. The client in this study entails learners, operation supervisors, plant and equipment managers as well as artisans who play a very important role of mentoring apprentices during On Job Training (OJT) as well as during the initial stages of employment of an artisan. It was important that stakeholders who are involved in the artisan development be part of this investigation so that their views are taken into consideration when the researcher compile findings and recommendations for future use and drawing up a plan of action in certain cases as part of the quest to find solutions to some of the challenges.

5.2 The Problem, Research Questions and Objectives

The main problem was that the artisans that are coming from the School of Engineering are unable to execute the tasks of repairing and servicing of the equipment that are being used to transport various goods and products to various destination of the country as quickly as possible. This inability to execute specific tasks has led to the stakeholders to blame the School of Engineering of producing poor quality of artisans. The researcher wanted to find out if the problem may only be attributed to the School of Engineering or there are other issues that needs further debate and research. The apprentice model was used as the bases of the study. In other words the researcher wanted to find out if all the bases of producing an apprentice was available and adequate that, the School of Engineering by failure to provide such tools it will mainly blamed for the lack of quality in the production of the quality artisans.

5.3 The following Questions required answers.

For the apprentice model to thrive all key requirements are required to be present. The question of community of practice where an apprentice learn the knowledge, skills and attitude from the experienced artisan through imitating what an experience person is doing. The finding on this specific criteria revealed the following:

- a) The community of practice for each and every discipline for apprentices was available because all the specific trades has specific mentors/teachers as well as artisans from the workplace who help apprentices to learn knowledge, skills and attitudes towards a specific trade profession.

- b) It was also revealed that part of the community of practice was not willingly happy to impart the knowledge, skills and attitudes that was required by the apprentices to ensure that their competency level was at the required standard. The artisan wanted to guard this area for themselves and their immediate communities instead of opening it up to the community at large. When the researcher solicit the reasons there was a variety of them like creating scarcity and the law of supply and demand kicks in and raised the price of those who are in. The researcher felt that this argument requires further research as some of the comments needs in debt interviews to understand them. It was also identified that, there was a jealous on some of the artisans that were interviewed by the researcher. They felt that the area of craftsmen is theirs, they see it as a threat if other people are joining in and felt that they may not able to work a lot of overtime which most of the artisans are known by working. They think that their income is also in danger.

- c) The community of practice available are as follows:
 - (i) Wagon fitters these are artisans repairing different types of wagons that are used as containers to transport goods like coal, iron ore, liquid like oil and petrol.
 - (ii) Electrical Fitters artisans that maintains locomotives.
 - (iii) Millwrights that maintains and repair different types of machines like milling machines, lathes, boilers and pumps. The School of Engineering is also involved in the training of such trades and there is congruence between protégés and mentors.

The next point for apprentice model to thrive is that there should be enough machinery in the school for the learners to learn by practising or learn by doing as a core of the apprenticeship learning process. The question was that are they available and are they enough in terms of the ratio of one machine two apprentices? The finding on this specific criteria revealed the following:

- (iv) The machines for learning by doing were available. The next question whether they are enough for the available learners.
- (v) Yes there were machines available for the available learners but in some cases they were not enough especial when some of the apprentices are doing their preparation for summative assessments while some of lower phases are still in their learning stage all of them they require the space on the same machines for them to practice.

The other question that the researcher wanted to answer was the issue of enough artisans to impart the knowledge, skills and attitudes that were required for an artisan. The following was revealed:

- (d) There was enough artisan to provide mentoring during the workplace experience. The majority of respondents revealed that there was an alignment on mentor apprentice ratio for an apprentice to learn knowledge, skills and attitudes required to be a quality artisan.
- (e) Certain artisans were not willingly imparting the skills to the apprentices. They were not happy because they were saying that they were not being compensated by the company for doing this job as they felt that it is an additional responsibility to their roles. Other artisans felt threatened by the apprentices they felt that they were better equipped as compared to them since they are learning through the modern equipment and they felt they may take their jobs.
- (f) The objective to understand whether the workplace in which the learners are to gain practical have suitable qualified artisans to conduct mentoring and coaching on these apprentices and whether are willing to impart the knowledge and skills to these apprentices was achieve by the findings of this measurement.

The other question that the researcher wanted to get answers for was the issue of do we have enough time for the apprentice to practice learned skills from the experiences artisans? The following was revealed:

- (vi) All stakeholders revealed that the days apprentices spending in the workplace were not enough for them to learn and nature the kills and talent that are required by the workplace. The average days spent by an apprentice in the workplace are 170. The feeling is that at least full one year should be spent on the workplace. The researcher sees an opportunity of comparative studies here as well where somebody may conduct a study on Time Based Modular Training and the current system which based on Competency Based Modular Training (CBMT) methodology.
- (vii) The objective to understand whether the time allocated by the guiding manual for On Job Training (OJT) is enough for the learner to gain proper exposure on the actual job activities was achieved through the findings of this measurement.

The other question the researcher wanted to get answers for was question of do we have structured method where the learner is able to be evaluated by the mentor during the workplace training called on the job training? The following was revealed:

- (ix) There was a structured evaluation for apprentice to gauge if they have absorbed what they were being taught during the workplace exposure. It was also noticed that there was a gap for improvement because some respondent felt that there was no adequate structured evaluations of apprentices. This is an opportunity for the school of engineering to look at ways to improve it with other stakeholders in the artisan development fraternity. That revealed a gap of inconsistency as it may happened that it depended on which section you were doing your On Job Training which needs not be like that at least a way of standardisation was necessary.
- (x) The objective to understand whether is there a structured approach with regards to evaluation of jobs done by apprentice to ensure an effective learning has taken place was achieved through the finding of this measurement.

There was a question of whether School of Engineering was keeping pace with technology evolution in the market so that the learners as the human factor of production remains relevant and easily employable by the owners of production. The following was revealed:

- (xi) The respondents acknowledged that there was technology in the school. Out of 111 respondents only 37 felt that the school was keeping pace with technology development in the market. 42 of the respondents were not sure if there was enough and relevant technology in the school, while 32 of the respondent felt that there was no alignment at all between the technology in the school and that in the industry.
- (xii) The objective to understand whether School of Engineering have the latest technology in the school which is encountered by artisans when are transferred to the workplace was achieved through the finding of this measurement.

There was another key area to be answered by the investigation which is the alignment of the modules in the school with the processes and machines that are in the workplace. The following was revealed:

- (xiii) The majority of the responded felt that there was a congruence between the equipment modules that are in the school with that in the workshop. The respondents also revealed that certain specific equipment modules were outdated when it comes to latest market trends. The researcher saw this as an opportunity for improvement as well. There was an opportunity for educating other stakeholders on the specific equipment modules that as there was a substantive number of respondents that were not certain about this measurement.
- (xiv) The objective of understanding whether the School of Engineering has relevant and latest modules was achieved through the finding of this measurement.
- (xv) The quality of artisans produced in line with the Education and Training Quality Assurance of the SETA that is ensuring that School of Engineering is in line with the curriculum it was found that the training was in par. The only challenge was that certain modules and technology was not in par with the expectation of the customers. The conclusion is that the customers as buyers of the School of Engineering products were not happy with the quality of the product.
- (xvi) Something has to be done to meet the customers' expectations.

5.4 Observations by the Research.

The researcher to ensure that certain measurement are not distorted went to the School of Engineering and asked certain audit records to verify information about monitoring of quality execution by relevant stakeholders. The Skills Development Act 97 of 1998 requires that a SETA establishes the Education and Training Quality Assurance body that monitors if the Skills Development providers are complying with specific requirements for training of artisans in the country. It was noticed that the only time the specific Sector Education and Training Authority visited the school was when there was an application for reaccreditation by the school which was two years back. This revealed that there was not yearly visit plan from the authority to enforce the requirements of the Skills Development Act as contemplated in the statute.

It was also noticed that the learning material was last reviewed in 1992. There was no mention in any of the quality assurance documents perused about the intervals of learning material reviews which may help in ensuring that the learning material was always relevant and to the workplace equipment of nowadays, neither school nor SETA quality management system was implicitly or explicitly mentioning anything about the intervals of reviewing learning material in line with the changes of the times. There was a mismatch between the technology the learners are being exposed on during the school as well as during workplace component. In the workplace there are latest technology like CNC, PLC and VSDs while the school is lagging behind when it comes to that.

5.5. Role of Stakeholders in the Artisan Development and Observation by the Researcher

It became clear that there was quite a number of role players in the field of artisan development that are expected to execute their roles with diligent that it deserve if all us we are going to reap the fruit that we shall be proud of one day. It is important that those role players are mentioned so that the reader is able to understand them and their roles. They are as follows, apprentice a person that is at the centre stage all resources are to be focussed on him/her as he is the process

of being improved to be a better factor of production in the manufacturing world. The school (Skills Development Provider by the new terms. The school has to establish buildings inside buildings the school has to buy and install machines that are going to be utilised by apprentice during their learning by doing so that they are mastering the skills required for the workplace). The other role players are the tutors who are required to be relevant to be able to teach the correct skills. The workplace is the other key role player. When an apprentice has not gone to the workplace for the time what is called On Job Training he may not finish his training. Will not qualify to seat for his last paper called trade test. Very important but overlooked by poor monitoring from other stakeholders. Sector Education and Training Authorities who are tasked with ensuring that they facilitate the learning of apprentices. Ensure quality of learning and teaching is taking place. What was noticed is that, all these stakeholders are not working as one unit to ensure that artisans produced is of high quality that all of us as South Africans may be proud of. There is a lot of blame game. Industry is blaming government, workplaces are blaming the schools, the schools are blaming SETAs and the damage is getting worse day by day.

5.6 Recommendations

The competitiveness of any business and industry is influenced mainly by the level at which the workforce employed by that particular organisation are competent. When an organisation has competent workforce it is easier for it to produce more quality goods at a quicker pace and able to sell goods at a cheaper rate because the quality and costs are related. It is against this background that the underlying objective of the investigation was to investigate the perception of customers about the quality of artisans being produced by the School of Engineering in its Durban campus. The ability of the artisans that were produced from the Durban campus was questionable from the eyes of the customers.

- a) Stakeholders should find the way on how to work together for the improving the quality of apprenticeship in the industry so that outsourcing of work that should be done by the internal artisan may be reduced. This will also reduce the costs of producing the goods and ultimately reduce the price per unit to the final clients.
- b) The learning material should be reviewed at least every three years to be in line with what is available in the real world.

- c) A consultative research team should be formed that may consist operations, the school and SETA and meet at least once a quarter to discuss new development on their space including new products that needs to be known by artisans.
- d) SETA quality assurance body should visit schools at least once per quarter to check if every compliance is adhered to.
- e) The school should invest on new technology like CNC (Computerise Numerical Control), PLC (Programmable Logic Controllers), and VSD (Variables Speed Drives). These are main technology the industry has invested on which creates a mismatch between what is available in the school and what is in the workplace.
- f) SETA should explicitly state the ratio of apprentice to machine as it came out in the research that the apprentice ratio to machine causes bottlenecks as learners have to wait turns to practice as not enough machines. School of Engineering should investigate how to apply for capital funding so that they may beef up the machines going forward. A relationship building forum where artisans and apprentices may meet in one platform and talk about their challenges that also may improve relationships and stop certain misconceptions about apprentices taking the jobs of artisans etc.
- g) An awareness campaign is also recommended where school of engineering may engage all artisans through the monthly operations meetings and discuss all concerns from artisans as their role is very important in the process of nurturing the skills of future artisans.

5.7 Recommendations for future Research

The fact is that the objective of this study was to investigate perception of poor quality of artisans being produced by School of Engineering Durban campus. During the study there were contentious issues with regards to artisan development and which are outside the scope of this research but which also requires specific answers if we want to ensure that artisan development is reaching the expected level where artisans are not told what to do but just do what is expected

of them even come with innovations where they tell employers what to do. In light of this the researcher would like to recommend that the following areas with regards to the quality of artisans be investigated.

- a) The comparative study between Time Based Modular Training and Competency Base Modular Training. Most of the old guys in the artisan training fraternity are always telling you that, it was the best method ever that was abandon.
- b) There is always a debate on how good is TBMT compared to CBMT. It is important that a study be done here so that we shall have differences presented and form part of the available literature, also to clarify advantages and disadvantages of each methods so that a solution may be investigated may to blend them may be the best solution.
- c) The other area of concern is the issue around background of our apprentices. Previously the majority of learners were dominated by certain racial and gender which has changed. Learning by doing is not available in most of the previously disadvantage schools. The language, machines, using hands in a specific way is not the area in which the majority of our learners found themselves in at the moment. It is necessary to investigate if the background does not have an influence on the quality of artisan are produced by School of Engineering.
- d) The researcher felt that a more in debt investigation is also done on the influence of technological development comparatively to what is available at school. It is important that the technology in our factories and the technology that apprentices are exposed on during the apprentices, the workplace and their secondary school which is the bridge to apprentices. This will shed a light on whether the learners have sufficient background on the technology that will take them to the next level in their careers.
- e) The researcher also had a concern that the study only concentrated on the internal forces as compared to also include the external sector when conducting the research. It is also recommended that, he future researchers when collecting data it should include SETAs and DHET as the custodians of artisan development in the country. In certain areas they may have answers even for future alignment.

- f) The other area of concern is the ratio between the number of apprentices per tutor and machine this area requires a further investigation as well. It came out during unstructured interviews but due to the fact that it was not a core of the study nothing would have been done. It is highly recommended that a further study directed at this point be instituted as well. It was also noted that not enough research have been done on this field which the researcher feel that is one of the important field if the country want to be an industrialised nation. Without skilled people very few investment may be attracted because investors wish to invest in an economy that is able to offer skilled personnel that are able to work faster in delivering the high quality goods to the clients at a reasonable price. It was noticed that this field has not been sufficiently researched for whatever reasons as there has been no much literature on it.

5.8 Conclusion.

The collected data revealed that the perceptions of the customers about the quality of artisans produced School of Engineering was poor when literal interpreted. But when a more indebt investigation and alignment to the quality artisan model was done the picture painted was different. It was revealed that School of Engineering has all the basic requirements to ensure that a quality artisan is being produced. This is in direct contrast with the perceptions of the clients with regards to the quality of artisan being produced by School of Engineering. The study revealed that there was no corroboration among the role players where each role is able to do what is supposed to do to ensure that during an apprenticeship the learners receives what is necessary to build a good quality future artisans. There is a need to create awareness among all role players to explain why they are important and why they have to execute their roles with diligence it's deserve. There are areas in which the school needs to improve for instance technology was a big concern from the study. The workplace exposure it was revealed that it was not enough to prepare apprentices to hit the ground running when completed their studies. This means that more time is required for people on workplace exposure before we may say they completed. It was also revealed that an opportunity where apprentices are learning by doing needs to be improved, there is a concern from the participants about the availability of equipment during trade test revisions while other people are doing their modules. It was noticed

that at the moment there is a bottleneck that is created by this situation which needs further investigation and rectification by the school.

The study did not conclusively revealed a clear cut between the quality and not quality of artisans being produced. There was a lot of participants that were not sure about certain measurement criteria which would have gave the conclusive evidence to certain questions that ended up not answered. There is a great need to create an awareness on the importance of apprenticeship and its requirements. Not enough money is being invested on this field by authorities. This is shown by participants on equipment and technology measurement criteria. It was also noticed that there was a tendency from apprentices to want to finish quicker as they want to ensure that they are getting to the employment and salary brackets are falling under artisans. This also may be the results of some of the newly qualified artisans are not good enough as they did not spend enough time learning and mastering the rope of the craft they are involved in.

List of References

1. Armstrong, T., 2008. *The Compulsory Certification Project*. Toronto: Queen's Printer for Ontario.
2. Barron, John M., Mark C. Berger, and Dan A. Black. 1997. "Introduction." In *On-the-Job Training*. Kalamazoo, MI: W.E. Up john: Institute for Employment Research, pp. 1-3.
3. Barak, M., Lipson A., Lerman, S. 2006 - *Journal of Research on Technology in Education*, 2006
4. Best, S., 2012. *Understanding and doing successful research: data collection and analysis for the social sciences*. London: Pearson.
5. Bolgar, C., 2010. High Productivity and Skilled Workers Attract Foreign Investors. *Journal of Impact on Productivity, Innovation by Skilled employees*, 40 (3).
6. Cappelli, P. (2012). *Why Good People Can't Get Jobs: The Skills Gap and What Companies Can Do About It*, Philadelphia: Wharton Digital Press.
7. Cedefop (2012a). *Future skills supply and demand in Europe: Forecast 2012* (Cedefop Research Paper No. 21), Luxembourg: Publications Office of the European Union.
8. Cedefop (2012b). "The Skill Mismatch Challenge in Europe", *Employment and Social Developments in Europe 2012*
9. Cochran-Smith, M., Lytle, S. (1999). Relationships of knowledge and practice: Teacher learning in communities. *Review of Research in Education*, 24, 249-305.
10. Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research*. (2nd ed.). Thousand. Oaks, CA: Sage.
11. De Vos, A. S., 2011. *Research at grass roots: for the social sciences and human services professions*. Pretoria: Van Schaik.

12. Elliot G (2009) Joint Initiative on Priority Skills Acquisition. Consolidated report: Artisan development for priority skills.
13. Fox, J., 2007. The uncertain relationship between transparency and accountability. *Development in Practice*, 17(4–5), 663–671.
14. Fox, R., 2007. Teaching through technology: changing practices in two universities. *International Journal on E-learning*, 6(2), 187-203. (R)
15. Fox, W., (2010). A guide to managing research. Cape Town: Juta.
16. Furseth, I., & Everett, E. L., (2013). Doing your master's dissertation: From start to finish. California, Sage Publication.
17. Hasluck, C., Hogarth, T., Maguire, M., and Pitcher, J. *Modern Apprenticeships: A Survey of Employers*, Department for Education and Employment Research Series, 1997
18. Khomo, M. P. 2007. Membership of the Library and Information Association of South Africa (LIASA) among Library and Information Service Workers in KZN. Durban: Durban University of Technology.
19. Lave, J. , & Wenger, E. (1 99 1). *Situated learning. Legitimate peripheral participation*. Cambridge, England: Cambridge University Press.
20. Lok, B., Fox, R., & McNaught, C., 2011. What values do students in Hong Kong attach to experiential learning opportunities? In E. O'Doherty (Ed.), *Education in a Changing Environment: Critical Voices, Critical Times. Santa Rosa, Informing Science Institute (ISI)*, (pp. 63-80). (R).
21. Lundell, P. (1997) The erosion of apprenticeship training in South Africa's metal and engineering industry. Masters thesis, University of Cape Town

22. Lundell P & Kimmie Z (1992) Apprentice training and artisan employment: Changing numbers but maintaining job reservation. *SA Labour Bulletin* 16(6): 42–45
23. Misko, J 2006, *Vocational education and training in Australia, the United Kingdom and Germany*, NCVET, Adelaide.
24. Monette, D.R., Gullivan, T.J. & DeJong, C.R. (2010) “Applied Social Research: A Tool for the Human Resources” Cengage Learning
25. Nielsen, K., and Kvale, S., 1999. *Mesterlaere: Laering som sosil praktisis*. Oslo: Ad Notam Gyldendal.
26. November, I., Alexander, G., van Wyk, M.M. and Bereng, T., The Legitimation of Recognition of Prior Learning (RPL) As Redress Mechanism For Work Spaces In Post-Apartheid South Africa: Narrative Of A Black Master Builder.
27. Patton, M. *Qualitative Evaluation and Research Methods. 3rd edn. Newbury Park, California: Sage* 2002.
28. Patton M.Q. *Qualitative research and evaluation methods. 3rd Sage Publications; Thousand Oaks, CA: 2002*
29. Polonsky, M.J. & Waller, D.S. (2011) “Designing and Managing a Research Project: A Business Student’s Guide” 2nd edition , SAGE
30. Pratt, D. and Johnson, J. (1998) ‘The Apprenticeship Perspective: Modelling Ways of Being’ in Pratt, D. (ed.) *Five Perspectives on Teaching in Adult and Higher Education* Malabar FL: Krieger Publishing Company
31. Rajasekar S. School of Physics, Bharathidasan University, Tiruchirapalli – 620 024, Tamilnadu, India_

32. Rubin, D., (2008). Statistical inference for causal effects, with emphasis on applications in epidemiology and medical statistics. II. In *Handbook of Statistics: Epidemiology and Medical Statistics* (C. R. Rao, J. P. Miller and D. C. Rao, eds.). Elsevier, The Netherlands
33. Seidman I (2006) *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*. Third edition. Teachers College Press, New York
34. Smith, E., Comyn, P., Brennan Kemmis, R., & Smith, A. (2009). High quality traineeships: identifying what works.
35. Stringer, E. (2007). *Action Research* (3rd ed.). Thousand Oaks, California: Sage Publications.
36. Savin-Baden and Major, C. H., 2010. *New approaches to qualitative research*. *British Journal of Educational Technology*, 42(1):16-17.
37. Saunders, M., Lewis and Thornhill, A., (2012). *Research methods for business students* 6th ed. English: Pearson.
38. Sekeran, U and Bougie, R., (2010). *Research methods for business: a skill building approach*. London: Wiley.
39. Silverman, D., (2008). *Doing qualitative research: a practical handbook* 2nd ed. London: Sage.
40. Skagen, K., 2004. *I veiledningens landskap*. Kristiansand: Hogskoleforlaget.
41. Trochim, William M., (2006). *The Research Methods Knowledge Base*, 2nd Edition. Internet WWW page, at URL: <<http://www.socialresearchmethods.net/kb/>> (version current as of 2006).
42. Woolf, B.P., 2010. *Building Intelligent Interactive Tutors: Student-centred strategies for future apprenticeship models*.

43. Yin, R., (2009): *Case Study Research*. 4th edition. Thousand Oaks, CA: Sage.
44. Zikmund, W., G., (2013). *Business Research Methods* 9th edition, Mason : OH, Thomson.

Annexure A

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL

For research with human participants

A. Information Sheet and Consent to Participate in Research

Date: 2017/02/22

Greetings, Ms. L. Thabethe

My name is (Thandukwazi Maxwell Magcaba) from (Transnet Engineering: School of Engineering in Durban, my email address is: Maxwell.Magcaba@transnet.net, Tel: 031 361 5928, Cell: 083 484 8561)

You are being invited to consider participating in a study that involves research on the

“Customers’ Perception of the quality of apprentice training provided by Transnet School of Engineering in Durban”

The aim and purpose of this research is to (investigate the reasons why the customers have a view that apprentice training that is being provided by School of Engineering’s Durban campus is not good quality). The study is expected to include (50 participants in total, 15 completed normal artisans, 5 master artisans, 10 tutors, 10 third phase apprentices, 5 supervisors, 5 managers. The whole study will be done in 311 Solomon Mahlangu Drive in Durban, all the participants are in the same location). It will involve the following procedures (The study will only take place). The duration of your participation if you choose to participate and remain in the study is expected to be 1 day. The study that you will be participating in is not funded by any organization so there is no organizational disclosure need.

The study will require you to be honest and disclose how you see the quality of training that is provided by School of Engineering in Durban. Any opinion will be confidential so you are welcomed to raise whatever opinion that will benefit the study. We hope that the study will create the platform of raising the points that are pressure points and areas that the school needs to improve for the benefit of apprentices, organization, the economy and the country at large. There are no direct benefits to you as a participants but indirect you will

benefit because our learners are the future of the organization and the country at large. The study will be conducted in person as well as through written questionnaires.

Please also take note that, there are no risks involved on your participation to this research. Researchers are ethically obliged to inform all participants when they may be exposed to any kind of risk by their participation in a particular research.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number: **HSS/2006/016M**).

In the event of any problems or concerns/questions you may contact the researcher at (0834848561/0846006024/031 361 5928, Maxwell.Magcaba@transnet.net) or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

Mrs Mariette Snyman

Humanities and Social Science Ethics (HSSREC) Research Office,

Govan Mbeki Building, Westville Campus, Private Bag X54001, DURBAN 4000

Tel: 031 260 8350 Snymanm@ukzn.ac.za

Researcher: Name: Thandukwazi Maxwell Magcaba (0834848561)

Supervisor: Name: Dr. Abdulla Kader (0829010225)

Your participation in the study is voluntary and by participating, you are granting the researcher permission to use your responses. You may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in the study. Your anonymity will be maintained by the researcher and the School of Management, I.T. & Governance and your responses will not be used for any purposes outside of this study.

All data, both electronic and hard copy, will be securely stored during the study and archived for 5 years. After this time, all data will be destroyed.

If you have any questions or concerns about participating in the study, please contact me or my research supervisor at the numbers listed above.

Sincerely

Thandukwazi Maxwell Magcaba

Date:...../02/2017

CONSENT TO PARTICIPATE

I Andre Cornelius have been informed about the study entitled: “Customers’ Perception of the quality of apprentice training provided by Transnet School of Engineering in Durban” by Thandukwazi M Magcaba the researcher.

I understand the purpose and procedures of the study (add these again if appropriate).

I have been given an opportunity to ask questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

I have been informed about any available compensation or medical treatment if injury occurs to me as a result of study-related procedures.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at 031 361 5928/083 484 8561/Maxwell.magcaba@transnet.net.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

Mrs Mariette Snyman

Humanities and Social Science Ethics (HSSREC) Research Office,

Govan Mbeki Building, Westville Campus, Private Bag X54001, DURBAN 4000

Tel: 031 260 8350 Snymanm@ukzn.ac.za

Researcher: Name (Telephone number)

Supervisor: Name (Office Telephone number)

Additional consent, where applicable

I hereby provide consent to:

Audio-record my interview / focus group discussion	YES / NO
Video-record my interview / focus group discussion	YES / NO
Use of my photographs for research purposes	YES / NO

_____	_____
Signature of Participant	Date

_____	_____
Signature of Witness	Date
(Where applicable)	

_____	_____
Signature of Translator	Date
(Where applicable)	

ANNEXURE B

QUESTIONNAIRE

FOR POSTGRADUATE STUDENTS

A COMPARATIVE PERSPECTIVE OF SUPERVISORS, ARTISANS, TUTORS, APPRENTICES AND MAINTENANCE MANAGERS' PERCEPTIONS OF ARTISANS PRODUCED BY THE SCHOOL OF ENGINEERING DURBAN CAMPUS

SECTION A

DEMOGRAPHIC DATA

Please respond to the following questions with the appropriate answer, please be honest and give your true answer this is important to gauge the level of our challenges.

	RESPONDENT	
1	Age	
2	Gender	
3	Position	
4	Years in the position/Experience	
5	Department	
6	Highest qualification	
7	Discipline undergoing/undergone e.g. Electrician	

SECTION B

SUPERVISORS, ARTISANS, TUTORS, APPRENTICES AND MAINTENANCE MANAGERS' PERCEPTIONS OF QUALITY OF ARTISANS BEING PRODUCED BY SCHOOL OF ENGINEERING DURBAN.

POOR QUALITY OF ARTISANS PRODUCED BY SCHOOL OF ENGINEERING IN DURBAN			
	Apprenticeship	Yes	No
1	Did apprenticeship at School of Engineering Durban	18	
2	Did apprenticeship at School of Engineering other Centre	2	
3	Did apprenticeship outside of Transnet	1	
4	Did not do apprenticeship.		2
TIME QUALIFIED AS AN ARTISAN			
		Yes	No
1	Currently and apprentice	10	

2	0-5 Years	3	
3	6-10 Years	3	
4	11-15 Years	1	
5	16-20 Years	2	
6	>20 Years	4	

APPRENTICESHIP USEFULNESS YOUR OPINION		Yes	No
1	Prepared apprentices well for future work environment	14	5
2	Prepared apprentices moderately for future work environment.	N/A	
3	Does not prepare students well for future work environment.	N/A	
4	State what you think needs to be done to prepare apprentices well:	N/A	
5	70% of the participants wish that the On Job Training days be increased. They think that would help to improve the quality of skills gained by apprentice as the probability of meeting a variety of challenges is higher when they are going to be in workplace many days as it is happening at the moment in line with CBMT (Competency Based Modular Training.)		
USEFULNESS OF ON JOB TRAINING		Yes	No
1	Prepared apprentices well for future work environment	15	2
2	Prepared apprentices moderately for future work environment.	N/A	
3	Does not prepare students well for future work environment.	N/A	
4	What needs to be improved? Participants in this section only mentioned OJT as well.		

SECTION C

PREPAREDNESS OF LEARNERS BY APPRENTICE SCHOOL

MODULES AT THE SCHOOL OF ENGINEERING		Yes	No
1	Does modules prepares you well for future work environment?	14	3
2	Does modules prepares you moderately for future work environment?		
3	Are machines in the school prepares you well for future work environment?	17	3
4	Modules in school are aligned with the work environment.	17	4
5	Machines in the school are aligned with work environment.	15	3
TECHNOLOGY EVOLOTION			
1	Do you think technology in the school needs attention?	20	3
2	Does technology in the school prepares you well for future work environment?	10	8
3	Does technology in the school prepares you moderately for future work environment?	16	3
4	Is the school investing enough on the new technology?	11	10
TUTORS DEDICATION TO TEACHING AND LEARNING			
1	All modules being facilitated by the tutors.	20	2
2	Tutors created a conducive environment for teaching and learning.	22	0
3	Tutors are helpful anytime I am stuck on certain modules.	21	1

4	Tutors are prepared to go extra mile and add extra work in line with future work.	15	4			
5	Tutors only do the minimum required by the curriculum	3	18			
6	Tutors are researching to improve learning and teaching in line with latest industry demands	15	6			
<p>SECTION D</p> <p>MULTIPLE SURVEY QUESTIONNAIRES EVALUATING THE TOPICS WITH REGARDS TO QUALITY OF ARTISANS PRODUCED BY SCHOOL OF ENGINEERING IN DURBAN.</p>						
	Rate the Statement regarding Poor quality of artisans produced by the School of Engineering Durban:	Agree	Strongly Agree	Not Sure	Disagree	Strongly Disagree
1	Modules are aligned to machines and equipment found in operation.	13	2	0	6	2
2	There is enough modules in the school which caters for both theory and practice.	13	3	4	11	2
3	There are enough machines to cater for all available students.	9	3	3	5	3
4	The machines are latest technology in line with operation.	7	2	7	5	0
5	Modules are current.	8	1	6	4	3
6	Does the school have latest technology in line with the industry?	4	1	8	7	2
7	Does the school keep pace with evolution of technology?	3	3	8	8	0
8	Is there a gap between the school and Industry technology?	5	4	9	2	2
9	Is the gap between latest technology and the school too big?	2	2	10	5	3
10	Is the school investing in the latest technology?	11	2	7	2	1

11	The mentor/apprentice alignment available?	12	0	5	5	0
12	Does the workplace have enough artisans to transfer skill to the apprentice for continuity?	10	3	6	5	2
13	Are artisans willing to mentor and coach future artisans?	9	2	6	6	1
14	Is the platform for apprentice to learn from their experienced artisans conducive?	12	3	5	3	1
15	On Job Training of learners takes place in a conducive environment.	15	5	2	1	0
16	OJT platform is planned properly when a learner reach the workplace supervisors and artisans are expecting the learner	11	5	5	2	1
17	The days for OJT are enough to learn the work related skills.	5	3	3	7	3
18	OJT prepares the apprentice well for the working environment.	6	8	1	7	1
19	OJT and School related practicing machines are aligned.	10	1	4	6	1
20	The artisans and supervisors helps the apprentices to gain the relevant skills in the shop floor.	11	4	5	3	0
21	Is the attitude of apprentices conducive for learning the new skills during OJT?	9	4	3	5	2
22	Tutors engage with supervisors and students during OJT?	9	4	4	4	2
23	Is there a monitoring and evaluation by the SETA?	4	2	14	2	1

24	Do you feel the quality of learning and teaching is up to the right level?	9	0	5	7	2
25	Facilitation of learning by the tutors met your expectations?	12	3	4	3	1
26	Do you feel the monitoring of learning and teaching by the campus managers is to the right level?	13	1	8	0	1