

An exploration of the skills set required for sustainable
employability of Technical Vocational Education and Training
(TVET) engineering graduates: The Case of Majuba TVET
College, Newcastle, KwaZulu-Natal

By

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ABSTRACT

This study sought to explore the skills set required for sustainable employability of Technical Vocational Education and Training (TVET) engineering graduates. The aim of the study at Majuba TVET College was to explore if there is an interface between skills acquired by Technical College graduates and the skills required by employers from engineering graduates, with respect to their sustainable employability. The study was guided by two research questions:

What skills set do Mechanical, Electrical and Civil Engineering graduates need for sustainable employability as:

Recommended by the NC(V)/Nated curriculum/policy?

Perceived by Engineering staff and graduates from Majuba TVET College?

Conceived by the engineering industry employers?

Is there an interface as defined by the above stakeholders? If so, what is its nature?

A qualitative case study approach was used to answer the research questions. Three types of data were generated: from policy documents for the Nated and National Certificate (Vocational) curricula, by open-ended questionnaires and through semi-structured interviews. The conceptual framework that guided this study drew firstly on Pavlova's three pillars of sustainable development, viz. economic, environmental and social and then on Singh Pillay's notion of interface. The data were analysed through document analysis, content analysis and the thematic methods. To answer research question two the results for sustainable employability skills acquired in research question one was juxtaposed to establish if an interface exists.

From the research findings, recommendations are made regarding the future of the Nated and NC(V) curriculum.

PREFACE

The work described in this thesis was carried out in the Science, Mathematics and Technology Education Cluster, University of KwaZulu-Natal, from July 2014 to December 2015 under the supervision of Dr A. Singh-Pillay and Mrs. M. Van Wyk.

This study represents original work by the author and has not otherwise been submitted in any form for any degree or diploma to any tertiary institution. Where use has been made of the work of others, it is duly acknowledged in the text.

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Date: _____

Supervisor: Dr. A. Singh- Pillay

Co-Supervisor: Mrs. M. Van Wyk

ETHICAL CLEARANCE



22 September 2015

Mr Joseph Mesuwini 214585612
School of Education
Edgewood Campus

Dear Mr Mesuwini

Protocol reference number: HSS/1260/015M

Project title: An exploration of the skills set required for sustainable employability of Technical Vocational Education and Training (TVET) engineering graduate: A Case for Majuba TVET College, Newcastle, KwaZulu-Natal

Full Approval – Expedited Application

In response to your application received on 7 September 2015, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
Dr Shenuka Singh (Chair)
Humanities & Social Sciences Research Ethics Committee

/pm

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Cc Academic Leader Research: Prof P Morojele
Cc School Administrator: Ms T Khumalo

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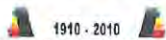
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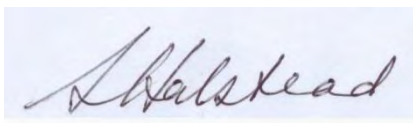
NAME: JOSEPH MESUWINI

DISSERTATION TITLE: An exploration of the skills set required for sustainable employability of Technical Vocational Education and Training (TVET) engineering graduates: The Case of Majuba TVET College, Newcastle, KwaZulu-Natal

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I confirm that I have edited this dissertation for grammar, appropriate use of academic language or conventions, and flow of the academic argument. I have also addressed formatting of the preliminary pages, the main text, figures, tables and references. I have recommended appropriate changes to the student and his supervisor.

I am a native English speaker. As an independent educational consultant, one of my specialisations is writing academic learning material and editing academic documents. I obtained a BSc at the University of Natal, with chemistry and applied mathematics majors. After graduation, I was a Research Officer in the Ministry of Roads and Road Traffic in, as was then, Rhodesia. My duties included writing reports and editing those by other authors. Some years later I entered the teaching profession and studied with UNISA for my postgraduate Higher Education Diploma, achieving a distinction for the English language module. After 20 years teaching at high school, I took up an academic position at the University of KwaZulu-Natal, where I completed an MSc in chemistry education and wrote several research articles. Since retirement three years ago, I have edited numerous academic papers and eight thesis or dissertations, one of which was judged to be *cum laude*.



Sheelagh Edith Halstead, 30 December 2015

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DEDICATION

This thesis is dedicated to **my wife, Judith, my children, Mary, Tatenda and Theophania** as well as **my parents and extendend family**.

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And to **my ailing parents**, (Mr and Mrs Mesuwini), I always had strength in their weaknesses.

Lastly, my brother **Jonathan Mesuwini** for the mutual support.

LIST OF ACRONYMS

ABET:	Adult Education and Training
CNC:	Computer Numerical control
DBSA:	Development Bank of Southern Africa
DHET:	Department of Higher Education and Training
DoE:	Department of Education
DoL:	Department of Labour
ETDP SETA:	Education, Training and Development Practices Sector Education and Training Authority
FET:	Further Education and Training
FETMIS:	Further Education and Training Management Information Systems
HE:	Higher Education
HEI:	Higher Education Institutions
HETMIS:	Higher Education and Training Management Information Systems
HRDC:	Human Resource Development Council
NATED:	National Accredited Technical Education Diploma
NC(V):	National Certificate (Vocational)
NDP:	National Development Plan
NGO:	Non-Governmental Programme
NPC:	National Planning Commission
NQF:	National Qualifications Framework
NSFAS:	National Students Financial Aid Scheme
RSA:	Republic of South Africa
SAIDE:	South African Institute for Distance Education
SAQA:	South African Qualifications Authority
SETA:	Skills Education and Training Authority
Stats SA:	Statistics South Africa

- TVE: Technical Vocational Education
- TVET: Technical Vocational Education and Training
- UKZN: University of KwaZulu Natal
- UNESCO: United Nations Educational Scientific and Cultural Organisation
- UNESCO-UNEVOC: International Centre for Technical and Vocational Education and Training of the United Nations Educational Scientific and Cultural Organisation
- VET: Vocational Education and Training

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CHAPTER 1

1.1 INTRODUCTION AND BACKGROUND

Education is seen, globally, as leverage to meet human, social, and economic and development needs of a country, as Frost (2005) and McGrath (2012) contend. But these scholars also argue that Higher Education (HE) institutions do not have the capacity to fulfil these outcomes. Nevertheless, Technical and Vocational Education and Training (TVET) colleges should be ideally positioned to respond to the aforementioned national needs because TVET is an important aspect of achieving relevant and high-quality education for all, education for sustainable development and the Millennium Development Goals, and so it is viewed as part of the lifelong learning agenda (King, 2011).

The World Bank has, historically, associated formal TVET intrinsically with the process of industrialization and economic development (UNESCO, 2012). This means that TVET training leads to productivity, which ultimately leads to a country's economic growth.

TVET can also play another essential role, that of alleviating poverty, through sustained human development and economic growth, with clear benefits for individuals, families, local communities and wider society (Maclean and Wilson, 2009; Norrag, 2003). This is to be expected because 80% of occupations are centred on applied technical and vocational skills (UNESCO, 2006). The World Bank (2010, p. 1) highlights the importance of skills for individuals and economies as “skills are at the core of improving individuals’ employment outcomes and increasing countries’ productivity and growth’. As conduits for skills development, TVET institutions are also seen as providing opportunities for developing individuals, their communities and society at large. Therefore TVET provisioning should address needs and contextual issues pertaining to sustainable development, individual livelihoods, social issues and equity (UNESCO, 2012). This means that TVET has a much wider influence than simply promoting skills development for employability (Fien, Maclean and Park, 2009). TVET is further seen as a means of ensuring sustainable lifestyles and occupations through the

development of knowledge and skills that can meet the needs for specific positions in the labour market and so improve personal quality of life.

Besides making individuals more employable, TVET should develop skills for work, life or sustainable livelihoods through self-employment or establishing a company or cooperative. In this way, everyone should be able to make a living and contribute skills to a developing economy (Tikly, 2013). The assumption is therefore that the TVET should play a dual role. On the one hand it contributes to economic development by providing skills needed to compete in an evolving global economic context. On the other hand, TVET should simultaneously contribute to poverty alleviation and social justice by widening participation in education and training targeted at employability. In other words, besides addressing national needs, TVET is also seen as a solution to poverty reduction and economic development. Besides technical knowledge, social skills are needed to build harmonious societies. Thus the two should develop together (Wals, 2009; McGrath, 2012). Consequently TVET colleges should be rooted in their communities, serving community as well as regional and national needs.

In South Africa TVET has become part of the overall educational system. Prior to 2012, vocational education and training were provided by Further Education and Training (FET) colleges. From 2012, all public FET colleges were incorporated into the Department of Higher Education and Training (DHET) and required to change their names to TVET colleges (DHET, 2012). In this way, the South African educational system came in line with international TVET trends. In South Africa, TVET colleges are regarded as a core component of the National Skills Development Strategy of the Department of Higher Education and Training. In addition in the White Paper on post schooling education and training DHET (2013) visualizes education as the primary route out of poverty for individuals, and as a way of promoting equal opportunities. TVET is associated with the training of a post-school, pre-employed youth component and has the potential to respond to the lifelong learning needs of the population. Therefore the TVET system is seen as an avenue for continuing education and training of both the employed and non-employed elements of society (Foster, 2005).

There are two programmes offered concurrently at TVET colleges, namely, the National Certificate (Vocational) (NC(V)) and the National Accredited Technical Education Diploma (Nated), which also known as Report 191 or N-Programme. The entry qualification to both programmes is a minimum of Grade 9 but a higher qualification is an advantage. These courses are aimed at equipping students with the required skills set for sustainable employability, so that they can contribute positively in their community, company, personal life and in the nation at large. The Nated course is offered over levels N1 to N6. Each level is covered in a single trimester (10 weeks) after which a national examination is written. By contrast, the NC(V) qualification is a full year programme at each of the National Qualifications Framework (NQF) levels (2, 3 and 4) of study and a certificate is issued on completion of each level. For NC(V), there are seven subjects in total which comprise four vocational subjects and three fundamental subjects (Language, Mathematics and Life Orientation). DHET (2012) stipulates that the ratio of practicals to theory is 60 to 40 respectively. These practicals offer a simulated workplace environment so that students may experience work situations whilst studying.

1.2 RATIONALE

The motivation to pursue this study arises from the mismatch between skills acquired by TVET graduates and those required by industry. Many recent studies have highlighted the huge gap between the skills employers expected and those provided by graduates employed directly from South African TVET (DHET, 2014; Hennemann and Liefner, 2010; Rasul and Mansor, 2013; Legg-Jack, 2014). Furthermore, Papier, Needham and McBride (2012, p. 5) emphasise that employers were confused and unsure of the NC(V) and that the three years of NC(V) training did not prepare TVET graduates adequately for a trade test in terms of the skills required. Put simply this means that the programmes and course work are often not representative of the field they are preparing graduates for. Therefore employers doubt the credentials and specific competency levels of graduates from these programmes. The aim of closing the skills gap has yet to be realized locally and globally (Allais, 2012; Wallace, 2009). To be specific the TVET curricula meet neither the needs of TVET students nor those of employers, because many graduates are not equipped for trade tests and hence fail them (Cosser, 2003). Additionally, TVET instructors or 'lecturers', lack suitable practical background or

experience in the field, and so prefer to teach theoretical concepts in the classroom as opposed to hands on skills in a laboratory setting (Papier, 2010). In summary, it is apparent from the literature that a disjuncture exists between skills acquired and skills required. Furthermore, Needham and Papier (2011) note the lack of mainstream literature on this problem in developing countries, especially in Africa.

There is also apparently no literature recording the graduates' views about the sustainable employability skills that they believe they need. Have the voices of the graduates been silent, or not heard?

My personal observation as a mechanical engineering lecturer at Majuba TVET College in Newcastle, KwaZulu-Natal also drives me to pursue this study. Currently two programmes, NC(V) and Nated, are running concurrently at our college. Neither programme seems to have made the intended difference in graduates' lives. In this regard, I have observed that a large number of our TVET graduates either fail or struggle to gain employment. Those that do find employment frequently undertake jobs that do not embrace their TVET qualification.

Accordingly, the mismatch highlighted in the literature and in my own experience, concerning the skills taught and skills needed undergirds this study.

1.3 PURPOSE OF THIS STUDY

The purpose of this study is to:

- Identify the sustainable employability skills sets recommended by the NC(V) and Nated policy or curriculum used at Majuba TVET College.
- Explore staff and graduates' perceptions on sustainable employability skills for Mechanical, Electrical and Civil Engineering graduates.
- Explore employers' perspectives on sustainable employability skills for Mechanical, Electrical and Civil Engineering graduates.
- Explore whether an interface exists between skills acquired and skills required and then describe the nature of the interface.

The research questions that guide this study are:

1. What skills set do Mechanical, Electrical and Civil Engineering graduates need for sustainable employability as:
 - a) Recommended by the NC(V) or Nated curriculum or policy?
 - b) Perceived by Engineering staff and graduates from Majuba TVET College?
 - c) Conceived by engineering industry employers
2. Is there an interface as defined by the above stakeholders? If so, what is its nature?

1.4 SIGNIFICANCE OF THIS STUDY

This study will be significant as it contributes to the gap identified in the literature in terms of TVET graduates' voices on sustainable employability skills. The interface will bring to the fore points of convergences and divergences between the different stakeholders in terms of sustainable employability skills. The interface will speak directly to TVET policy makers, curriculum designers, TVET institutions, and TVET lecturers in terms of what skills are required for sustainable employability. The interface could thus be used to bridge the divide between skills required and skills acquired.

The findings of this study will furthermore allow me to teach in a more nuanced way, as I will be more aware of the skills required for sustainable employability.

1.5 LIMITATIONS OF THIS STUDY

This study uses a case study method for the Majuba TVET College situated in New Castle, KwaZulu-Natal (KZN). Case study methods may be criticized because the results cannot be generalized. I justify the use of a case study method by referring to Flyvbjerg (2006) who argues for single cases, by referring to the experiments, and experiences of Galileo, Newton, Einstein, Bohr, Darwin, Marx, and Freud to point out that both human and natural sciences can be advanced by a single case. Case study allows for an in-depth and detailed thick descriptions of what skills are required for sustainable employability from the perspective of the various stakeholders in this study.

1.6 CLARIFICATION OF TERMS

Some key terms used in this study need clarification because they may have different meanings to different individuals and hence need to be clarified for the purpose of this study.

1.6.1 Sustainable employability skills:

According to Yorke (2004, p.7) sustainable employability skills is a “a set of achievements, understandings and personal attributes that make individuals more likely to gain employment and be successful in their chosen career, which benefits themselves, the workforce, the community and the economy”. This means that sustainable employability skills should equip individuals to be lifelong learners (“be successful”) in their chosen vocations in order to benefit themselves and the employer (“likely to gain employment”) as well as allow individuals to become entrepreneur who are involved in job creation (“to benefit the community and economy”).

1.6.2 Interface

According to Singh-Pillay (2010), interfaces arise out of the points of convergence and divergence between people’s approaches to or views on an issue. Accordingly, in this study, an interface is construed as a meeting point (convergence) or a point of deviation (divergence) between sustainable employability skills acquired (via the curriculum) and required (by graduates, employers, lecturers). The notion of interface will be used to look for congruence (convergences) or non-congruence (divergences) between sustainable employability skills as acquired or required.

1.6.3 Sustainable Development Approach

According to UNESCO (2012) within a sustainable development approach TVET can help to overcome disadvantages, thereby achieving social as well as economic goals. The sustainable development approach emphasises the purpose of TVET as the provision of skills to support economic, social and environmental sustainability.

1.6.4 Human Capital Approach

As the phrase ‘human capital’ suggests, individuals have certain capacities or skills of a cognitive, physical, social, or psychological nature by which they earn a living (Taubman and Wales, 1974). The human capital approach has its roots in the industrial

revolution and sees the role of TVET colleges as being purely for preparing graduates for the labour market (Maclean and Park, 2008; Tikly, 2013; and Maclean and Pavlova, 2013).

1.7 OVERVIEW OF CHAPTERS TO FOLLOW

This research report is organized into six chapters with the following content.

Chapter one sets the stage for the study and therefore consist of the introduction, motivation for the study, purpose of the study, research questions, significance of the study, limitations of the study and clarifies the important terms used in the study.

Chapter two: This chapter focuses on literature relevant to the research question posed, as well as the conceptual framework which forms the basis of the analysis and arguments put forward in this report.

Chapter three: This chapter sets the stage for the research methodology. It consists of an introduction, the research method, the research design, methods of data analysis, ethical considerations and a conclusion. The development of materials and processes undertaken to improve on the reliability of results and the different data collection tools used are discussed in depth.

Chapter four: This chapter presents the analysis of the data for research question one.

Chapter five: The presentation of the findings and discussion for research question two is undertaken in chapter 5.

Chapter six: This chapter consists of a critical discussion on key aspects of the research.

The next chapter will focus on the review of relevant literature and the theoretical framework.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

As alluded to in chapter one, the lack of necessary skills in the work environment constrains the economic growth of any country as well as its human resources development. There is tension between skills required, skills acquired and human and economic development. At their intersection lies the TVET sector. TVET may ease this tension by developing these much needed skills and contributing to human resources and economic development. TVET has several roles. It may be a means of preparing students for occupational fields and effective participation in the world of work; an aspect of lifelong learning and preparation for responsible citizenship; an instrument for promoting environmentally sound, sustainable development and a method of alleviating poverty (UNESCO, 2015). This means, that TVET has the transformative capacity that promises its students the right to quick employment (Maclean, 2011).

In this chapter I review the literature and present the conceptual framework relevant to this study. The literature surveyed focuses first on TVET globally and then in South Africa. Second, the literature review examines the role of TVET from:

- a human capital perspective,
- the human capability and social justice approach,
- the economic, equity and transformative viewpoint,
- the perspective of the White Paper,
- the skills development approach,
- the national development plan approach.

Third, the literature pertaining to the disjuncture between skills required for the world of work and skills acquired by graduates is brought to the fore. Fourth the conceptual framework that underpins this study is elucidated. Lastly a conclusion for the chapter is provided.

2.2 TVET GLOBALLY

Technical and Vocational Education and Training (TVET) has emerged as one of the most effective human resource development strategies that African countries need to embrace to train and modernize their technical workforce for rapid industrialization and national development (The African Union, 2007). Within Africa, TVET is seen as a leverage for industrial, economic and national development. It drew attention and gained momentum in the 1960s (The African Economic Outlook, 2015) and many African nations injected finances in the 1980s to begin formalizing their TVET system (The African Union, 2007). TVET systems in Africa differ among countries, being delivered at different levels at a variety of institutions, such as technical and vocational schools, polytechnics, and apprenticeship training centres. Except for a few countries (notably, South Africa, Botswana, Mauritius, Tanzania, Malawi, and Namibia), TVET provision in Africa is spread over different government ministries and organisations, including non-governmental organisations (NGOs) and church-based organisations, with a multiplicity of testing and certification standards (The African Union, 2007). UNESCO (2015) reiterate that this situation has implications for standardizing training, cost-effectiveness, quality assurance, recognition of prior learning, and further education of TVET graduates. Despite these differences, certain common key terms are embraced within the African TVET sector, such as, apprenticeship training, vocational education, technical education, technical vocational education (TVE), vocational education and training (UNESCO-UNEVOC 2006). These terms undergird the provision of TVET.

In all Sub-Saharan Africa, formal TVET programmes are school-based, where students enter the vocational education track at either the end of primary school, corresponding to 6 – 8 years of education (for example in countries like Burkina Faso and Kenya) or at the end of lower or junior secondary school (what is called basic education), corresponding to 9 –12 years (in countries such as Ghana, Nigeria, Mali and Swaziland) (Johanson and Adams, 2004). In an attempt to expose young people to twenty first century pre-employment skills, countries such as Senegal, and Swaziland have incorporated basic vocational skills into the lower or junior secondary school curriculum (UNEVOC 2013b). However, the African Union (2007, p. 20) objects to the inclusion of TVET in junior secondary schools because employment-oriented training

requires qualified instructors and material resources that are not available for all junior secondary schools or even clusters of secondary schools.

For many years, TVET in Africa has been considered as a career path for the less academically endowed. Tickly (2013); Afeti (2014); Carton (2012) and Legg-jack (2014) jointly posit that this perception has been fueled by four issues. First, TVET programmes have low academic requirements for admission and offer limited prospects for further education and professional development (World Bank Institute, 2000). Second, there is a distinction between 'white collar employment' (professionals who work in offices) and 'blue collar employment' (artisans with technical skills in the various crafts and trades) (UNESCO-UNEVOC, 2006). Third, governments often create the impression that TVET is primarily designed to keep secondary school dropouts off the streets, rather than being a critically considered strategy to train skilled workers for the labour market (Afeti, 2014). Fourth, the vocational education track has the unfortunate reputation of being a dead-end, so far as academic progression of TVET graduates and students into higher education institutions (HEI) is concerned (Carton, 2012). It seems that the academic divide between the HEI curriculum and TVET curriculum is too great, which hints at the marginalization that TVET institutions and TVET graduates encounter. In this regard, Tickly (2013, p. 4) asserts that there is growing recognition of different forms of marginalization, based on social class, rurality and ethnicity as well as the nature of valued skills.

In short, the main challenges that confront TVET in Africa, include standardizing training, cost-effectiveness, quality assurance, recognition of prior learning, and further education of TVET graduates added to the perception that TVET is an inferior career choice.

Despite the negative African experience with TVET, there are nevertheless some other countries with robust TVET systems that contribute to their economic and human resources development needs. Japan and China enjoy high economic growth and extremely low unemployment rates due to their skilled labour forces (Agrawal, 2013). The Republic of Korea has an effective TVET system, which is facilitated by both its Ministries of Education and Labour (World Bank, 2013). The two ministries work hand in hand to prepare a highly skilled workforce that contributes to the country's industrial

and economic growth as well as its human capital needs (UNESCO, 1999). In Singapore and Mauritius, the government and private sector team up in training the workforce through industrial vocational training boards. These committees determine short-term training needs within the frameworks of national economic policies and long-term goals of continuous retraining and upgrading of the workforce (UNESCO-UNEVOC 1999). Within the European context, France has general, technical schools and vocational schools, which offer classes in both general subjects and in subjects relating to technology and professional training (UNESCO, 1999). Germany, Austria and Switzerland, use an apprenticeship system, which today absorbs three-quarters of their youth (UNESCO, 2012a, p. 7). In short, where countries take TVET seriously it contributes rightfully to economic and social development needs (Tickly, 2013).

Successful TVET systems from other countries do not translate linearly into Africa, where socio-economic and cultural contexts determine what is possible to implement or adapt (UNESCO 2012). This means that African countries should not be over ambitious and import programmes which they cannot support effectively (Euler, 2013).

Globally, the most important objectives of TVET are its alignment with the world of work and the curriculum should be weighted towards employable skills (UNESCO, 2014).

2.3 TVET IN SOUTH AFRICA

In this section the literature reviewed is arranged as follows: organisation and administration of TVET, support for TVET and TVET curriculum reform.

2.3.1. Organisation and administration of TVET

There has been significant redesigning of education and training landscape in South Africa since 1994 (Mouton, Louw & Strydom, 2012) when eighteen racially-divided departments were restructured into nine provincial departments, with an over-arching national department to provide coherent policy (Chisholm, 2004; Harley & Wedekind, 2004; Jansen, 2001). The restructuring meant that control of TVET colleges was transferred from the Departments of Education to the Department of Higher Education and training (DHET). The DHET Green Paper for post school education and training states that the apartheid education system denied educational training opportunities to black South Africans and its legacy still pervades the education and training system

(DHET, 2012, p. 7). The legacy particularly manifests in remote or rural areas where access to suitable TVET education still poses a challenge.

2.3.2. Support for TVET

Various systems have been designed to support TVET colleges in ensuring delivery of the core business and maintenance of its records. These include the Higher Education and Training Management Information System (HETMIS) with its forerunner (Further Education and Training Management Information System (FETMIS) and the National Student Financial Aid Scheme (NSFAS). However, McGrath and Akoojee (2009) argue that comparisons between the FET [TVET] examination database and the FETMIS or HETMIS data sets for 2007 to 2009 reveal inconsistencies, from which they concluded that the data sets are incomplete and unusable. Similarly, Wedekind (2012, p. 3) concurs on the dysfunctional FETMIS database, with very little official information being available in the public domain. The problem persists, and my personal experience with the current software used for data capture by all TVET colleges which is not user-friendly, and so can give more problems than answers. Ultimately, it is the students who suffer the negative effects of the poor systems.

The educational needs of young people and the demand for these skills in the labour market cannot be met by the institutional capacity of the TVET system, according to the Development Bank of Southern Africa (DBSA, 2011, p. 26). Hence, both the scale and the quality of vocational education are substantial bottlenecks in economic growth and the labour market. The DHET has also called for the expansion of the TVET sector in South Africa so that it can absorb more young people, who are not in education, employment or training (Sheppard & Cloete, 2009).

Perold, Cloete and Papier (2012, p.102) support this need for increased capacity in their call for major investments in infrastructure development, training of appropriately qualified staff, strong industry–TVET collaboration agreements, increased state subsidies for the post-secondary education system, as well as sufficient student financial aid to ensure a productive population. Muller (2011) argues that almost all FET or TVET colleges are characterised by their poor quality and sub-optimal delivery of the new upgraded FET curriculum. TVET colleges have a complex role due to the diversity of the incoming students. To elaborate, people who seek training include: “those who

want to complete their senior secondary education; those who want to take short courses and bridging programmes to transit to the next level in their working lives; those who want to complete the foundation phase of higher education programmes; those who want to be trained for occupation; and the undecided” (DBSA, 2011, p. 26). There is no single programme capable of satisfying these diverse needs of young South Africans. Moreover, the NC(V) programmes are still politically contested, very demanding of the students and not linked to any meaningful progression routes (DBSA, 2011, p. 26). As dominant provider of vocational training in South Africa, the TVET college system needs insurmountable financial input and effective support from government.

There are enormous demands on the South African education and training department to develop appropriate skills and capacities in the youth (DBSA, 2011, p. 5). Current youth unemployment poses a formidable challenge for the nation, as shown in the Statistics South Africa (2015, p. 7) report: “the unemployment rate among youth [aged 15 to 34] increased from 32.7% to 36.1% between 2008 and 2014”. These unemployed men and women are those who have prematurely dropped out of school and are unskilled. They are mostly unemployed because they do not have a starting qualification (DBSA, 2011). A possible solution could be for Adult Education and Training level 4 or Grade 9 learners to enter TVET colleges for post school education and training, as suggested in the White Paper on Post-School Education and Training (DHET 2013). However, unemployed youths need funding for their studies.

Student funding comes principally from the National Student Financial Aid Scheme (NSFAS), which has only recently been expanded to include students in TVET colleges. The Minister for Higher Education stated: ‘In 2011 Government took the bold decision to further increase the FET bursary allocation fourfold from R318-million in 2010 to R1.235 billion in 2011. This is the single largest ever increase in government funding for FET Colleges. The minister added that more money would be directed to elevate the stature of and programmes offered at TVET colleges. “Our top priority is to expand them while improving their quality” (Nzimande, 2012, p. 3).

Whilst financial aspects appear to have been addressed, to ensure quality training in TVET this increased financing needs to be translated into adequate facilities in terms of equipment and buildings. According to Afeti (2014), if TVET is to meet its intended

objectives, there must be adequate training facilities and appropriate workshop equipment to ensure quality training in TVET institutions. However, a key factor inhibiting effective TVET curriculum implementation is the lack of space. In this regard, Abassah (2011) contends that many Technical Colleges lack technical equipment and have inadequate workshops. He argues that in some Technical Colleges this is due to the shortage of workshop space for installation of equipment, even if it were supplied.

2.3.3. TVET curriculum reform

For over 40 years the Technical Colleges in South Africa offered Nated programmes as a recognised route to artisan qualifications. The Nated engineering programme on levels N1 to N6, which are equivalent to NQF levels. Levels N1 to N3 have compulsory mathematics and science subjects, in addition to vocational subjects. For each N level, students choose four vocational subjects from a range including Mathematics, Engineering Science, Fitting and Machining, Engineering Drawing, Mechanotechnology, Platers theory, Power Machines. Each level is scheduled for a period of ten weeks of teaching and learning per trimester. In 2006 the Department of Education announced that the Nated courses were to be discontinued in order to “solve the problem of poor quality and low relevance of N programmes and the chronically short supply of work placements available to students, as well as the low technical and cognitive skills of TVET graduates” (Duncan, 2009, p. 27). Conflicting views remain amongst stakeholders about the value of Nated courses (DHET, 2010). Some stakeholders are emphatic that they are outdated and lag behind applied disciplinary knowledge, whilst industrialists argue that the N courses should not have been abandoned, but should instead be modernized (DHET, 2010). Furthermore, in many industries they are still a vital component of artisan training. The Department of Higher Education and Training gazetted an extension for the offering of N1-N3 programmes up to 2010 in engineering fields, so as to provide skilled artisans and access to N4–N6 programmes for those that wanted to earn diplomas. So these ‘outdated’ courses are still offered in mechanical engineering (e.g. fitting, diesel and motor trade, millwright), civil engineering (carpentry, plumbing and bricklaying) and electrical engineering (heavy and light current, instrumentation etc.) (DHET, 2010). As can be seen, the timeline for the phasing out of Nated courses keeps shifting (Sigodi 2013).

In South Africa, TVET colleges have offered the National Certificate Vocational NC(V) qualification parallel to the Nated (N) programmes since 2007 (Jet, 2010; SAIDE, 2006; DHET, 2012). The NC(V) is registered as a 130-credit qualification at NQF Level 4 (Umalusi, 2010). The NC(V) targets employed individuals and provides them with vocational training at NQF¹ levels 2, 3 and 4. It is designed to provide both theory and practice in real or simulated workplace environments (DHET, 2009. p. 5). Besides the four chosen vocational subjects, mathematics is compulsory. In order to improve their communication and life skills, students must also study language and life orientation. This means that a student who has already passed Grade 12 before enrolling for NC(V) at a TVET college has to repeat Grade 10, 11 and 12 in mathematics, English and life orientation. This requirement is therefore contrary to the policy outlined in the White Paper on Post-School Education and Training, which recommends that there should always be a way for people to improve their qualifications without undue repetition (DHET, 2012).

Students who progress to Nated N6 need eighteen months of work experience in a field related to their qualification before being awarded a full diploma. Without the necessary work experience, students have only a theoretical N6 qualification, which makes it difficult to find appropriate employment. In the engineering division N1, N2 and N3 have remained with N2 being the minimum academic qualification requirement for a person aspiring to be an artisan after passing the trade test (Freeman 2010). Currently the N1-N3 programmes are quality assured by UMALUSI, the quality assurance body for schools and TVET Colleges. If the Nated programmes were discontinued, a suitable programme leading to trade testing would still be required from the DHET or other stakeholders. The Nated programme is theoretically based but it still gives the student

NQF levels 2, 3 and 4 are equivalent to grade 9, 10 and 12 respectively (SAQA 2012; UMALUSI 2010). SAQA (2012) describes NQF as a comprehensive system approved by the Minister for the classification, registration, publication and articulation of quality assured national qualifications. The NC(V) at Levels 2 - 4 on the NQF is aimed at students at NQF Levels 2 - 4 in Further Education and Training (FET) public and private colleges, as well as in other institutions offering FET Vocational programmes.

The NC(V) at Level 2 and 3 of the NQF enables students to acquire the necessary knowledge, practical skills, applied competence and understanding required for employment at an elementary level of a particular occupation or trade, or class of occupations or trades.

The NC(V) at Level 4 on the NQF enables students to acquire the necessary knowledge, practical skills, applied competence and understanding required for employment in a particular occupation or trade, or class of occupations or trades, or for entrance into Higher Education. The NC(V) at Level 4 on the NQF provides learning experiences in situations contextually relevant to the particular vocational area in which the programme is situated (UMALUSI 2013, p. 13).

the opportunity to complete their studies and enter the world of work. This route is far quicker than that via NC(V) (Freeman, 2010). More so the apprenticeships allow students to be able to do their theory and immediately go back into industry to implement and practice what they have been taught.

The N4-N6 qualifications are quality assured by the Quality Council for Trades and Occupations, which is not yet fully operational.

It is evident that the curriculum changes brought about in the move from Nated to NCV have not served the needs of potential apprentices. Furthermore, TVET College provision is now viewed with suspicion by industry and other stakeholders.

2.4 DIFFERENT VIEWS OF THE ROLE OF TVET

Further Education and Training Colleges have important roles in the education landscape of South Africa (Pillay, 2009). On the one hand, the FET/TVET sector is well positioned between compulsory general education and higher education, and on the other hand is an important link between schooling and the world of work.

While private providers of TVET may be driven by demand, the public education system is expected to respond to the national agenda for skills development and human resource supply, within a context of equity (Akoojee, 2005). It is against this background that this study aims to contribute to the policy discourse for TVET by providing a platform for the voices of various players involved in the training of the skilled personnel to be heard. In a strategic planning workshop for 2016 at Majuba TVET College, the rector reiterated that all employees needed to be responsive to the needs of communities, industries and the nation at large. He affirmed that the college has an undertaking to ensure re-skilling and retraining of some lecturers so that they could meet the demand of the programmes and cope with the rapidly changing world. To this end, a lecturer placement officer at Majuba TVET College has been appointed to liaise with industry and place lecturers for appropriate industrial exposure. The remainder of this section considers different approaches, or lenses through which one can examine the role of TVET.

A primary role of the TVET College sector is expanding access to education and training opportunities and thereby increasing high levels of excellence and innovation. By these means, the Green Paper for post-school education and training (DHET, 2012) envisages TVET in assisting in overcoming the structural challenges facing society. Similarly, Fisher and Scott (2011) see the TVET sector as providing “second-chance” opportunities to premature school-leavers, as well as alternative entry routes into higher education through “bridging” or junior undergraduate programmes. Therefore, besides its significant role of addressing acute shortage of middle-level skills, as noted by Sheppard and Sheppard (2012), numerous authors (e.g. McGrath, 2012; Walker et al., 2009; Powell, 2009) argue for a broader purpose for the TVET sector in South Africa. They believe it should go far beyond the economic domain and also focus on human well-being, lifelong learning and supporting learning for multiple purposes.

Since 1994, there have been many changes in the TVET sector. When it became evident that there is a need for a more skilled work force and that many learners leave school without plans for the future, FET Colleges became the new focus of the Department of Education (Gewe, 2010). This new focus resulting in merging smaller FET College into larger units.

The rationale for merging TVET Colleges was based on political, economic and educational agendas, with a view to transforming the sector through addressing past disparities and widening access to these institutions thereby providing relevant education to all learners (Pillay, 2009, p. 14). In this way, by merging colleges, the TVET sector could thus be central in the government’s strategy to tackle skills shortages, job creation and economic growth. Besides, producing graduates with suitable skills and competencies for the human resource needs of the country, another stated goal of the DHET, is: “To provide a full spectrum of advanced educational opportunities for an expanding range of the population irrespective of race, gender, age, creed or class or other forms of discrimination” (DHET, White paper 1997, p. 127). Accordingly, being widely distributed across all nine provinces, TVET colleges are well positioned to widen access, because they have better coverage than other institutions of higher education (DHET, 2010).

According to the Green Paper (2012) on post school education and training, the goals of TVET are to:

- Provide trained personnel in the applied sciences, technology and business particularly at craft, advanced craft and technical levels;
- Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; and
- Give training and impart the necessary skills to individuals who shall be self-reliant economically.

2.4.1 Human capital perspective

The human capital approach has its roots in the industrial revolution and the philosophy of “productivism” (Anderson, 2009). In this approach, TVET is perceived as being fundamentally instrumental in providing the necessary human capital required by industry (Tikly, 2013, p. 5). TVET system should be geared towards economic productivity, and focused on skills development for employability, by preparing graduates directly to meet labour force requirements (Fien, Maclean and Park, 2008; Tikly, 2013; and Maclean and Pavlova, 2013). The human capital approach suggests that education or training raises the productivity of workers by imparting useful knowledge and skills, thereby raising workers’ future income by increasing their earnings (Becker, 1994). I am of the opinion that the human capital approach offers a linear understanding of the relationship between skills, employment and economic growth. In other words, it assumes a “one size fits all” approach to education and skills but it does not consider inequality and marginalization.

2.4.2 Human capability and social justice approach

The human capability approach allows for a paradigm shift from a focus on economic growth and national income to a focus on human well-being (Sen, 2005; Tikly and Barrett, 2011; Powell, 2012). The capabilities approach provides a comprehensive framework for conceptualising the quality of life and well-being of individuals. Capabilities comprise the opportunities available to a person to live a flourishing life or, stated differently, “what a person is able to do or be” (Sen, 2005, p.153). The purpose of development in the capabilities approach is to expand the freedom that human beings have to be, and the agency to choose these beings and doings (Powell & Lolwana, 2012). The capabilities approach thus emphasises human flourishing, with economic

growth seen as a necessary but not sufficient means to achieve this development. In TVET Colleges this aspect requires training and equipping people with lifelong skills.

The human capital approach is based on the assumption that the realization of human capabilities and well-being, rather than the pursuit of wealth, underpins development (HRDC, 2014). The emphasis is on removing the “substantive un-freedoms” that hinder people from living a fulfilled life. By putting the needs of people – rather than the needs of the economy – first, the capability approach brings the discourse of social justice, human rights, and poverty alleviation to the forefront of our discussion of skills development and TVET (Powell, 2012, p. 9). Within the capabilities approach poverty is viewed as multidimensional deprivations of freedom. These deprivations are driven by two aspects: the opportunity aspect whereby freedom is constrained by limited opportunities to achieve, and the process aspect through constrained opportunities for agency and choice (Alkire, 2005; Leßmann, 2011).

The capability to choose exists as what Nussbaum (2000, p. 84) calls an “internal capability”, which develops only with support from the surrounding environment. As a learnt capability, it requires support and teaching from others for it to develop. Leßmann (2009) suggests that a critical role for education in poverty alleviation is to develop this capability to choose. With reference to TVET colleges, the students need strong input from all angles so that they make informed choices on the courses that they study.

The White Paper on Post School Education and Training, (DHET, 2013) mentions the injustices and inequalities that are rooted in South Africa’s colonial and apartheid past. It is not by accident that the remaining disparities of wealth, educational access and attainment, health status and access to opportunities are still largely based on race and gender (DHET, 2013, p. 4). The arrival of democracy has empowered the black African middle class, and many of its members have since managed to change their lives. Nevertheless, inequalities such as gender, race, socio-economic status, disability, or health status still persist. According to Tikly (2013), the human capital approach was developed in response to the new challenges facing the global economy in general (an increasing skills gap within and between countries), and TVET in particular (different forms of marginalization based, for example, on social class, rurality, gender and ethnicity). It is evident that people living in rural areas have fewer educational and

employment opportunities than urban residents. The same applies to those in townships and informal settlements compared with their suburban counterparts. This has been observed where township TVET campuses, including Majuba TVET College, have a stigma compared to those in town. As stated in the White Paper, (DHET, 2013, p. 5), the achieving greater social justice depends closely on equitable access by all sections of the population to quality education.

2.4.3 Economic, Equity and Transformative lens approach

The economic lens is used to analyse the efficiency and effectiveness with which TVET supports favourable outcomes for learners in the world of work, and the extent to which TVET can meet labour market demands for skills. Fulfilling the economic purposes of TVET requires addressing matters of accountability, responsiveness and attractiveness (UNESCO, 2012). The economic, equity and transformative lens approach was developed in response to the current challenges of chronic unemployment and underemployment; rapid changes in the labour markets; an increased demand by young people and adults for more education and training opportunities; and poor articulation of TVET to the demands of the labour market, higher education and socio-economic development (HRDC, 2014). This approach is mainly aimed at reshaping TVET policies for the entire TVET system to promote “building skills for work and life” (UNESCO, 2012, p. 102). McGrath (2012) says that the economic lens is the most conventional one used to analyse Vocational Education and Training (VET), but the equity lens is also very well-established in some parts of the world.

The equity lens focuses on how to make TVET accessible to all, especially previously marginalised groups such as females and people with disabilities. The policy implication is that the TVET system must have the capacity to meet the challenges of advancing access, equity and inclusion in TVET learning, whether in structured programmes, in the world of work, or in everyday life (HRDC, 2014). However, inequity in TVET access is a systemic problem. To elaborate, initial access to TVET, whether public or private, depends on socio-economic factors and prior educational attainment, which serves to reward those who are already more advantaged (UNESCO, 2012). It is alleged that women, particularly those with young children, minorities, and people living with disabilities often have less access to TVET than their peers

(UNESCO, 2012). McGrath (2012) echoes the idea that employees with higher existing levels of education and training typically get better access to further learning.

The transformative lens looks at how TVET systems can be strengthened to include lifelong learning and other sustainable development issues (HRDC, 2014). In this, it questions how well current approaches to TVET are likely to meet the needs of future labour markets and future generations. The transformative lens also asks how TVET can best support innovation and develop green and sustainable economies or societies (UNESCO, 2012). It helps stakeholders create a vision of TVET that is more responsive to contextual factors and long-term development trends. The transformative lens widens the conceptualisation of TVET from the more traditional learning to “know” and “learning to do” to encompass “learning to be” and “learning to live together”.

McGrath (2012) emphasises that the three lenses (economic, equity and transformative) must be seen as interlocking and not as policy alternatives. Thus the main purpose of the TVET system becomes its contribution to the wider development priorities of the country or society (UNESCO, p. 6).

2.4.4 Perspective of the White Paper on Post Schooling Education

The White Paper (DHET, 2012) outlines the government’s vision as it strives to build a post-school system that is fair, equitable, non-racial and non-sexist. The purpose of the TVET college sector within the post-school education and training system is “to prepare workers for the labour market, or to enable individuals to earn sustainable livelihoods through self-employment or establishing a company or cooperative” (DHET, 2012, p. 13). This system will be well coordinated, with improved quality and increased diversity of provision. The system responds to the needs of individual citizens, employers in public and private sectors, and broader societal and developmental objectives. The White Paper (DHET, 2013) states that the education and training system aims to meet the needs of learners of all ages and levels. The White Paper emphasise the importance of partnerships between educational institutions and employers. In my view this is a cornerstone to the skills development strategy, as every TVET graduate needs workplace experience to qualify in the trained field of expertise. In particular it discusses involving various economic sectors and employers in the education system; reviewing current college curricula; renewing efforts to monitor and enhance the quality

of education in colleges; and creating better alignment between SETAs, TVETs, universities, and other educational providers. In essence, it presents a general strategy to turn post-school education in South Africa into a "single, coordinated system" that will be better able to empower school-leaving South Africans, and that will strengthen the South African skilled labour force as a whole (DHET, 2012).

The estimated TVET enrolment targets for 2013 was 650 000, one million in 2015, with a projection of 2.5 million by 2030 (DHET, 2012). Furthermore, the White Paper gives the national target is to produce 30 000 artisans a year by 2030 (DHET, 2012; DBSA, 2011; HRDC, 2014). The White Paper acknowledges the possibility for colleges and SETAs to work together for the work placement to become a more structured internship. The DHET's highest priority is strengthening and expanding the public TVET colleges and turning them into attractive institutions of choice for school leavers (DHET, 2012). The White Paper also highlights that the education and training system "should not only provide knowledge and skills required by the economy, it should also contribute to developing thinking citizens, who can function effectively, creatively and ethically as part of a democratic society (DHET, 2012). They should have an understanding of their society and be able to participate fully in its political, social and cultural life" (DHET, 2012). Accordingly, it can be seen that government policy includes both the economic and educational roles of TVET.

The White Paper gives future plans for community college options, catering for both youth and adults who do not qualify for universities or TVET colleges. Such colleges should build on the experiences and traditions of community, and individuals' prior education developed over many decades by non-formal, community-based and non-governmental organisations (DHET, 2012). The community colleges would thus facilitate lifelong learning in the communities through offering literacy, numeracy and vocational skills. . This would enhance personal, social and employment experiences whilst also contributing to local needs and development. In the long run it would assist the community organisations and institutions, local government, local businesses and individuals to work together in developing their communities by building on the existing pool of knowledge and skills (HRDC, 2014).

The White Paper for Post School education and Training proposes that by 2030 there will be at least one institution offering TVET programmes in every district in the country (DHET, 2012). Some of these programmes may not be in TVET colleges, but could be offered in community colleges or other suitable institutions. The White Paper also notes the important role played by distance education in the expansion of TVET provision. Nevertheless, there is still very little distance education offered in TVET being based at an open learning campus, I have been able to observe first-hand the challenges involved in such a mode of delivery.

2.4.5 Skills development approach

The Department of Labour's Green Paper initiated a skills development strategy for economic and employment growth in South Africa (DoL, 1997). The Green Paper emphasised a proactive approach to creating new skill demands and social protection for vulnerable groups. The DoL acknowledges that, while responsiveness to demand must characterise a new human resource development strategy, skills development cannot be driven solely by short-term, market-led imperatives (DoL 2007). Medium-term planning is required to meet the higher-level skill demands of the future. The National Skills Development Strategies I, II and III are some of the medium term plans by which the government intends to provide appropriate skills (DHET, 2012). These strategies are aligned with the government's policy of an integrated approach to education and training and its commitment to lifelong learning. In an effort to uplift TVET, the White Paper, (see 1839467033.3930916) proposes that TVET colleges should progressively shift towards an increasingly larger proportion of their students being enrolled in NQF Level 5 programmes – that is, at Higher Certificate or equivalent level (DHET, 2012) – in order to accommodate the increasingly large numbers of matriculants seeking opportunities for technical and vocational education (DHET, 2012, p. 13).

2.4.6 National development plan approach

The task of developing an overall vision, as the National Development Plan (NDP) was given in May 2010 to the National Planning Commission (NPC) by President Jacob Zuma. The NDP published as NPC (2011) is a broad strategic framework that sets out a coherent and holistic approach to confronting poverty and inequality by 2030. The plan's holistic definition of living standards is consistent with the capabilities approach

(see section 2.4.2) advanced by the Commission. Of these capabilities, education and skills, and the opportunity to work, are also key areas where South Africa needs to make progress.

The NDP reminds us that the constitution provides a vision of a united, prosperous, non-racial and non-sexist society; a country that belongs to all who live in it, united in its diversity. The Constitution also obliges the country to heal the divisions of the past, recognising that South Africa emerged from a system where the majority of its citizens were robbed of opportunity (NPC, 2011, p. 38). This is where the disparities created by apartheid are expected to be addressed. The commission agrees that the shadow of history still lingers. The country is still divided along race and class lines. Social divisions are underpinned by massive inequalities (NPC, 2011, p. 481).

The NDP says that South Africa has a duty to reduce poverty and inequality by broadening opportunity and employment through economic inclusion, education and skills, and specific redress measures (NDP, 2012). It must promote mutual respect and inclusiveness by acting on the constitutional imperative that South Africa belongs to all (rainbow nation) and that all are equal before the law and deepen the appreciation of citizens' responsibilities and obligations towards one another (NDP, 2012). The commission believes that eleven million jobs can be created by 2030 through building partnerships between the public sector, business and labour to facilitate, direct and promote investment in labour-intensive areas. The New Growth Path outlines similar key targets, which include the aim producing 30 000 engineers by 2014, with a focus on Mathematics and Science, as well as producing 50 000 artisans by 2015 (NDP, 2012). By 2030, the NDP sees a South Africa that has an education system with the following attributes:

- Quality school education, with globally competitive literacy and numeracy standards.
- Further and higher education and training that enables people to fulfil their potential.
- An expanding higher-education sector that can contribute to rising incomes, higher productivity and the shift to a more knowledge-intensive economy.

- A wider system of innovation that links universities, science councils and other research and development role players with priority areas of the economy (NDP, 2012, p. 38).

As NDP expounds (NPC, 2012, p. 40): the “FET [TVET] system is not effective. It is too small and the output quality is poor. Continuous quality improvement is needed as the system expands. The quality and relevance of courses needs urgent attention”.

2.4.7 Summary/conclusions/ overall ideas

This section has shown the different lenses through which TVET can be viewed: Human capital perspective, human capability and social justice approach, economic, equity and transformation lens, perspective of the white paper on post schooling education, skills development approach and the NDP plan approach. The policy statements of South African government indicate aspirations to address these issues. However it can be seen that making significant differences for the country, society and individuals will depend on the problems identified.

2.5 THE DISJUNCTURE BETWEEN THE WORLD OF WORK AND GRADUATES’ SKILLS

Globalisation is a force driving the need for a flexible and competent workforce (Nikandrou, Papalexandris, & Bourantas, 2000). To be globally competitive industries must invest in developing employees to cope with technological transformations in the work place (Noe, 2002). There is a global concern that graduates of developed and developing countries do not possess the skills required by the labour force (Kimani, 2000). Consequently educational institutions, such as TVET colleges, remain very relevant.

The mission of the TVET sector, as stated in South African policy documents (DoE 1998); is to foster intermediate to high level skills and to facilitate the transition from school to work. In the Further Education and Training Act 98 of 1998 indicates in Section 29(1) that everyone has the right to basic education, including adult basic education and further education, which should be made progressively more available and accessible.

However, Jacobsz (2005, p. 55) states that FET [TVET] institutions are often accused of separating theory and practice, giving rise to irrelevant programmes and failing to meet the needs of learners and the changing demands from the economy and society. The lack of relevant training programmes is often said to contribute to high levels of unemployment, whilst poorly articulated FET programmes and qualifications inhibit learner mobility across programmes and between higher education institutions.

The South African Institute for Distance Education (SAIDE, 2006) claims that the shortage of suitably qualified lecturers continues to dog the TVET sector; hence the urgent need for re-skilling of lecturers to support delivery of new programmes. In response, TVET college lecturers have been placed in industries to gain practical experience. However, the Department of Higher Education and Training (DHET, 2010) noted that although lecturers may now have education qualifications through staff development, many of them lack occupational qualifications, relevant occupational work experience and industry contacts. These deficits create serious difficulties for TVET colleges' efforts to align programmes with industry needs. Furthermore, Adams (2011, p.28) maintains that that learners' and parents' expectations were sometimes compromised by the lack of college sector capacity to deliver NC(V) programmes as required. The Minister of Higher Education Nzimande (2012) has also acknowledged the challenges faced by the quality of programmes at TVET colleges:

The TVET College System is not effective. It is too small and the output quality is poor. Continuous quality improvement is needed as the system expands. The quality and relevance of courses need urgent attention. When quality starts to improve and the employability of graduates begin to increase. Simply growing the sector without focusing on quality is likely to be expensive and demoralising for young people, further stigmatising the system.

Saravanan (2009) believes that employability of graduate students will be enhanced by introducing soft skills into the programmes, so that students can become suitable persons in any institution. The NC(V) programme partially addresses the issue of soft skills as embraces life orientation (computer skills), communications skills and mathematics. However, the duration of the NC(V) programme – a full year for each

level with three years to obtain National Qualifications Framework (NQF) level 4 – precludes employees from enrolling as trainees in NC(V) courses. Griesel and Parker (2009) also argues that one needs to be realistic about the extent to which higher education can reduce the gap between higher education outcomes and employer expectations, and that employers need to also consider their role in providing on-the-job training and continuous development.

There are however, questions around the new NC(V) curriculum, and its relevance to industrial employers. Akoojee and McGrath (2009) support this idea when they raise questions about the fitness of the purpose and presumed equivalence between the qualifications under the NQF. They are alert to a danger that NC(V) may be inadequate for labour market purposes. According to the South African Qualifications Authority (SAQA, 2010), NC(V) aims to equip learners adequately for entry into the world of work by providing them with the practical knowledge and skills related to a particular vocational sector as well as means to cope with socio-economic challenges of the day to day life. A ministerial task team on NC(V) revealed that although industry was offered a chance to give support of the programme, there was very poor participation which yielded limited concrete input (DHET, 2013). Gewer (2010) also comments on the general perception that NC(V) has disrupted any attempts to forge relationships with industry. Gewer (2010, p. 17) says:

“More fundamentally, there appears to be persistent absence of an enabling framework for colleges and industry to work together. Colleges lack the capability and credibility to engage with industry on equal terms. Employers on the other hand are reluctant to work with colleges and do not have faith in the college’s ability to produce quality graduates. There is uncertainty about what the NCV will produce and what level of output will be achieved”.

He argues that the consequent distrust for the first three years of NC(V) implementation has caused industry to turn to other sources for skilled staff, including taking Grade 12 school leavers for apprenticeship training.

According to the Education, Training and Development Practices Sector Education and Training Authority (ETDP SETA; 2012) Public Further Education and Training Sector

Skills Plan 2013/14 update, the TVET Colleges are regarded as weak institutions because they are struggling to fulfill their mandates of producing a skilled work force for industry. The public FET or TVET College sector has not only experienced institutional mergers but also curriculum re-engineering, resulting in institutions that look more like schools with young students pursuing full-time studies of a fixed curriculum, pegged at basic school levels (Grades 10-12) (DHET 2013,). The 2009 CHET publication describes the post-school education and work environment as characterised by a large annual outflow of students from schooling, without meaningful further educational opportunities, and a post-school institutional architecture that limits further educational opportunities for young people.

At a seminar to consider phasing out Nated courses, Dr Peliwe Lolwana, visiting associate professor at the University Of Witwatersrand School Of Education, said:

‘The decision to withdraw the Nated courses in the first place was premature. It was a mistake. There should have been a parallel system where the N courses were offered as a safety net or back-up to the NCV, which was new and not tested.’ ‘The NCV is a better curriculum and it demands a whole lot more from students. While people are saying the NCV is not working, we are not asking how it is not working. ‘With the N courses you are nine months at work, then three months in a college. You start contributing to the production of the company. With the NCV, employers can’t cope with the system of full-time study.’ (Mail & Guardian, 04 December 2009).

She stressed that Nated courses are of inferior quality and there had been several complaints around this. Employers expect graduates to have mastered thinking skills related to creativity, making decisions, solving problems, visualising and knowing how to learn, how to reason and conceptualise ideas (Mail and Guardian, 2009). Moreover, a graduate with personal qualities such as responsibility, self-esteem, sociability, self-management, integrity and honesty will be a great asset and will adapt well to any working environment when employed.

In a study by Jacobsz (2005, p. 56) it is proposed that future TVET programmes for the employed must provide a greater balance between generic and specific skills, whilst the existing skills of employed workers need to be recognised and upgraded to meet the increasing demands of the economy. Thus the training offered by the TVET sector must keep pace with industrial and commercial restructuring. As most employed clientele are adults, learning must also be provided in accessible and flexible modes of delivery, leading to recognised qualifications, or credits towards qualifications, so that the skills acquired become portable (Jacobsz n.d). However, the current NC(V) programme does not allow for part time study while students are employed . In addition, the TVET sector must also strive to provide programmes in lifelong personal development to improve the quality of life of its clients. One accepts that not all programmes will lead to recognised qualifications, but they should be presented in such a way that they encourage learners to progress to programmes which lead to formal qualifications and employment.

The mission of SAQA is to ensure the development and implementation of a National Qualifications Framework, which contributes to the full development of each learner, as well as to the social and economic development of the nation at large (DoE, 2000). The success of SAQA in meeting its mandate depends on the appropriate provision of appropriate resources, including those for teaching and learning and other support materials. In particular, physical facilities such as workshops or specialised rooms such as laboratories, equipment and training materials appropriate to the method of delivery are required, according to the national norms (DoE, 2000).

The discussion above shows that the deficiency emphasises the urgency for transformation and substantiates the perspective that current FET or TVET programmes have failed to equip South African learners for the social, economic and cultural challenges facing them during the 21st century (DoE, 2000).

Lecturers regarded the new NC(V) curricula as more academically challenging than the previous Nated curricula, resulting in the need for more training for staff in teaching and classroom management (McBride et al., 2009, p. 23). College staff is now faced with teaching a younger cohort of students, without necessarily being trained for it (Fryer, 2014, p. 21). Specifically the staff wanted help in interpreting the curriculum documents, but also in arriving at a common understanding of what was required

(McBride, et al., 2009). A study by the South African Qualifications Authority (SAQA, 2012) and Department of Higher Education and Training (2012a) found that there was a huge gap between what employers expected and what they got after hiring a graduate straight from tertiary studies. This brings the point of interest to the researcher to explore the views of the graduates that have studied through Majuba TVET.

FET colleges are reported to have a poor image with employers and therefore only a minority of their graduates, aggregated across all fields, find employment (Mail and Guardian, 2012). In a similar vein, Magnus et al. (2013) note the view that the vocationally-oriented NC(V) programmes offered at colleges are not useful, work-focused or flexible, thus leading employers to reject the programmes offered. They comment further that due to lack of flexibility and lack of industry support for the NC(V) programmes, the phasing out of the engineering Nated programmes was halted in 2010. There are slim chances for employed workers to attend NC(V) programmes since they are all done on a full-time basis. Makole (2010) echoes that there are uncertainties on whether the NC(V) curriculum prepares learners to enter specific occupations or whether it is a foundational programme that prepares learners to qualify for other occupational learning programmes.

More recently numerous organizations (NPC, 2012; HRDC, 2014 and DHET, 2012) were in consensus that the TVET College sector is not meeting the needs of the economy or society as a whole. This may lead authorities to address the flaws contributing negatively to ailing FET or TVET colleges. At the same time there are people such as (Makole, 2010) who argue that general academic skills alone have no practical utility, and that employers will always need content and context-specific experts to solve expert tasks.

In a study by McGrath et al. (2010) it was reported that:

Lecturers were ill-prepared for the many younger learners pushed into NC(V) programme by schools when these learners were judged not able to cope with the academic syllabus in schools, as well as older learners who had been out of school for a while and had diverse academic support needs.

As stated earlier this is currently receiving attention as colleges are engaging with industry to place lecturers who lack industrial experience so that they can be equipped with the necessary skills to impart to students. A study by Wedekind (2010) revealed that the vast majority of lecturers with education qualifications have general qualifications, or those suitable for school teaching, rather than qualifications designed for college lecturers.

The FET Institute (2010) posits that because the cognitive demand of the NC(V) programme was too high for poorly prepared learners collective effort should be brought to bear in “getting the right learner into the right programme” (Papier, 2009, p. 44). However, Akoojee and McGrath (2009) argue that there are questions about the fitness of the purpose of TVET programmes and its presumed equivalence under the NQF; consequently, there appears to be a danger that the NC(V) may be inadequate for labour market purposes.

The core business of TVET colleges is to bridge the gap between theory and practice. They should therefore promote lifelong learning and education on-the-job. This means that they are expected to produce competent graduates with diplomas that enable them to compete both theoretically and practically. Thus, the Sector Education and Training Authorities (SETAs) are well placed to act as brokers between TVET colleges and employers, providing valuable sector skills information that would influence how colleges should structure their curriculum delivery. In a keynote address the Minister for Higher Education, Dr Nzimande, stated that SETAs can help build the capacity of colleges in collaboration with employers with specific needs for certain skills, providing sufficient resources and support for work integrated learning, placement, learnerships and internships (DHET, 2012).

2.6 GAP IDENTIFIED IN EXISTING LITERATURE

While the existing literature give voice to concerns from industry, basic and higher education and academics, it appears that graduates themselves have been unheard in determining sustainable employability skills set. The research will endeavour to gather the views of the graduates, employers and engineering lecturers. Needham and Papier (2011) reiterate that there is lack of mainstream literature on the African context and that of other developing nations. This is supported by Wedekind (2008) when he notes

only a handful of studies that examine the complex issue of knowledge in the technical and vocational field and how this is translated into curriculum. Furthermore, although as mentioned earlier claims that college lecturers are ill-qualified for their position, there is little published about their biographical profile, and why they choose to teach at TVET Colleges. There are appeals for more research about the TVET College staff to address the relative dearth of research in this area (Wedekind, 2008, p. 14; Wedekind and Watson, 2012). The issue is now urgent, given the DHET's resolve to retain the NCV.

Wedekind (2008) suggest that the education system in South Africa is much poorer for its lack of attention to FET and TVET. He further comments that there have been almost no direct engagements by academics in the policy processes or critical questions asked about the developments in TVET system in South Africa possibly due to higher education researchers and academics being obsessed by schooling. From a wider perspective, The African Union (2007) argues that feedback from past trainees on the quality of the training they had received and their experience-based inputs would be valuable in the review of curricula and training packages, but these factors are often lost. In other words, tracer studies that could improve the market responsiveness of training programmes are seldom used in Africa (African Union 2007). DHET (2010) sums up this discussion by noting the limited research available that could provide a nuanced picture into college system and its strengths and weaknesses.

2.7 CONCEPTUAL FRAMEWORK

This study focuses on sustainable employability skills of TVET graduates and the interface between the skills sets acquired and required, so the conceptual framework guiding it is the sustainable development approach proposed by Pavlova (2007) and Singh- Pillay's (2010) notion of interface.

The sustainable development approach emphasises the purpose of TVET as the provision of skills to support economic, social and environmental sustainability. Thus TVET's role is the preparation of learners for sustainable livelihoods (Tikly, 2013, p. 15). Competencies in economic literacy, sustainable consumption and managing small enterprises are emphasized in relation to the economic aspects, while using resources wisely and minimizing waste and pollution are considered central to ensuring

environmental sustainability (UNESCO, 2006; Fien and Wilson, 2005; Maclean, 2010 and Tikly, 2013). The sustainable development approach has broadened the concept of employability to include lifelong learning; sustainable economies in the context of the information age and the knowledge economy; education for all; and education for human security. According to UNESCO (2012) within a sustainable development approach TVET can help overcome disadvantages, thereby achieving social as well as economic goals. The indicators of each pillar, as emphasised by UNESCO (2006) and Tickly (2013), will be used as selective filters to scan the data (from the curriculum, TVET graduates, teachers and employers) in order to establish its link to the sustainable employability skills mentioned. They are summarized below, and their relationship explained in Figure 1 below.

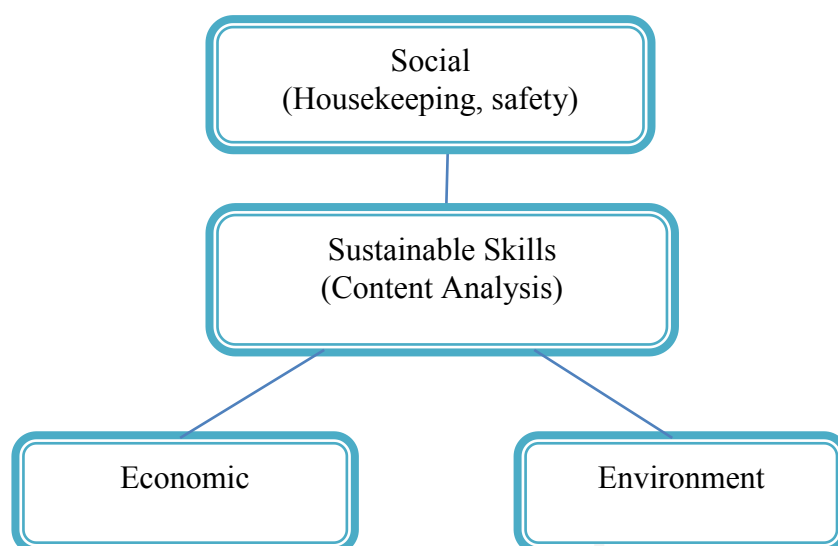


Figure 1: Conceptual Framework related to the Sustainable Approach

Figure 1 above shows the relationship between the three pillars in terms of sustainable employability skills. The economic pillar is concerned with economic literacy, sustainable consumption, employment, productivity and the social pillar embraces lifelong learning, self-reliance, human security, poverty reduction, social upliftment and the environmental pillar entails green technologies, minimizing waste/pollution, wise use of resources.

To establish if there is an interface between sustainable skills required and acquired Singh-Pillay's idea of interfaces will be used.

According to Singh-Pillay (2010), interfaces arise out of the points of convergence and divergence between the elements or people's views. It is this understanding that is applied in this study. The concept of an interface is construed as a meeting point (convergence) or a point of deviation (divergence) between sustainable employability skills acquired (via the curriculum) and required (by graduates, employers, lecturers). The notion of interface will be used to look for congruence (convergences) or divergences (non-congruence) with regard to sustainable employability skills acquired and required. The factors that enable or impinge the interfaces will be used to explicate the nature of the interface.

The relationships at the interface are indicated in figure 2 below.

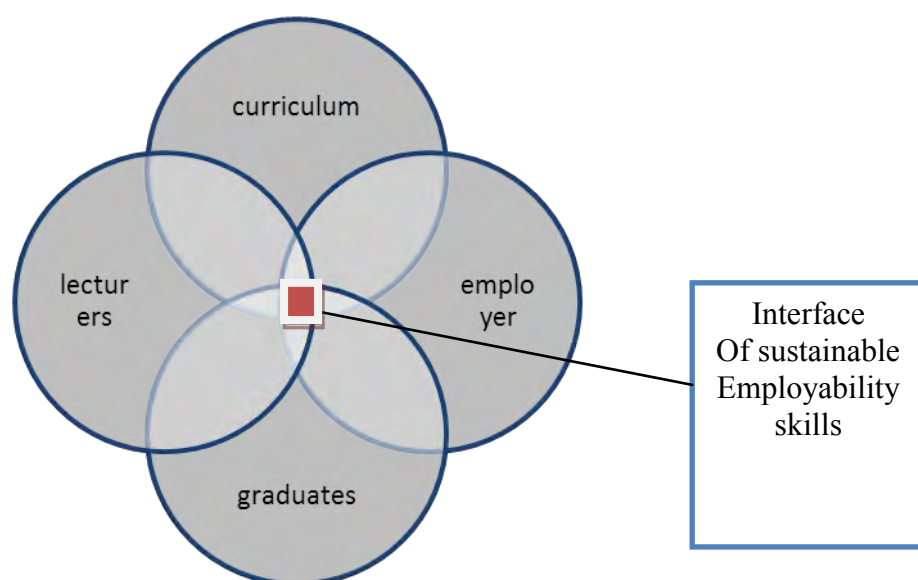


Figure 2: Interface amongst stakeholders for sustainable employability skills

The point of convergence amongst the lecturers, TVET curriculum, employers and graduates will result in interfaces of sustainable employability skills. The points of divergences will be used to describe the nature of the interface.

2.8. CONCLUSION

In this chapter I reviewed literature that focused on TVET, globally and in South Africa. I also examined the role of TVET from a human capital perspective, the human capability and social justice approach, the economic, equity and transformative lens, the perspective of the White Paper as well as the skills development approach. The review highlighted the disjuncture between skills required for the world of work and skills

acquired by graduates. The conceptual framework which guides the research was discussed. Lastly a conclusion was provided for this chapter. The next chapter focuses on the methodology used.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research methodology employed in the study. It outlines the paradigm and reasoning behind the choice of procedures used to carry out this qualitative study. I also justify why qualitative case study approach was adopted to explore the skill sets that Mechanical, Electrical and Civil Engineering graduates need for sustainable employability from the perspective of different stakeholders (government policy, TVET college lecturers, graduates, and industrialists). I discuss the stages of generating data, on the skills sets to establish if there is an interface in terms of skills sets as defined by the above stakeholders, and to describe its nature.

In addition, the research site and the data collection method employed in the study are revealed. An account is provided of how various gatekeepers at each stage of the research were approached in order to gain access. The instruments used and the sampling procedure used in the study are explicated. This is followed by the description of data collection procedure and the method of data analysis. The chapter ends with the description of the validity and reliability of the instruments.

3.2 RESEARCH DESIGN

Research design refers to a plan for selecting subjects, research sites and data collection procedures to answer research questions (McMillan and Schumacher, 2010). Research is designed to ensure that the chosen methods lead to answering the given research questions. For the purpose of this study a qualitative research approach is used. According to Durrheim (2006, p. 35), in qualitative research, the design of the study is usually "more open, fluid and changeable", flexible and non-sequential. Atkinson et al. (2001, p. 7) describe qualitative research as a form of social inquiry that focuses on the way people interpret and make sense of their experiences and the world in which they live. Creswell (2013, p. 20) maintains that researchers using a qualitative approach seek to establish the meaning of a phenomenon from the participants' viewpoint. I gave

meaning to the stakeholders' responses to skills sets required by TVET engineering graduates for sustainable employability. I interpreted the data by analysing stakeholders responses and thereby established if an interface exists in terms of skills set required and then described the nature of the interface.

3.3 RESEARCH PARADIGM

This research lies within the interpretivist paradigm. The interpretive paradigm is concerned with understanding the world as it is from subjective experiences of individuals (Cohen & Manion, 2011). Within this framework the various stakeholders (lecturers, graduates, policy makers, industrialists) are seen as social beings situated within a particular social background, within which they work. Their social background is influenced by contextual factors, such as resources, globalization, neoliberal demands and types of training. These are considered, when I examine the skill sets required for sustainable employability and then determine if an interface exists, and finally describe the nature of the interface. Hence, the study draws from the assumptions of the interpretivist paradigm to explore skill sets required by TVET engineering graduates for sustainable employability.

3.4 CASE STUDY

The interpretive paradigm which grounds this research directs it to deploy a case study approach to explore the skills sets required by TVET engineering graduates from the perspective of policy makers, lecturers, graduates and industrialists. A case study is an in-depth analysis of a single entity (McMillan and Schumacher, 2010, p. 344). According to Creswell (2013, p. 99), a case study research approach aims to explore in order to understand things in detail. In this regard, Yin (2009) maintains that case study is an empirical inquiry approach that investigates a phenomenon within its real-life context. The method allows participants to freely share their ideas, views, perceptions and experiences in their natural settings, making it possible for the participants to provide in-depth information/data (Cohen, Manion, & Morrison, 2013, p. 289). This means that a case study is very suitable and useful when a researcher is seeking for in-depth understanding of a specific event, process, organisation or particular group or groups of people in a particular place. In case study research methodology, the real-life context is a major factor as it gives the researcher the opportunity of interacting with the

participants in their natural setting, thereby leading to in-depth understanding and interpretation of the phenomenon under investigation.

The distinguishing feature of case study approach is that the methodology provides rich, thick descriptions of the participants lived experiences, thoughts and feeling about a particular phenomenon within a specific context, using multiple data sources (Merriam, 2009).

Yin (1994) forcefully argues that the relative size of the sample, whether two or ten cases are used, does not transform the validity of the case. In this way, even a single case could be considered acceptable, provided it meets the established objective. In this study, the assumption is that the case will represent other TVET colleges in South Africa because the engineering courses offered at public colleges are all the same. The case being studied is a group of engineering graduates (mechanical, civil and electrical) of Majuba TVET College in Newcastle. It will focus on employed, unemployed and self-employed graduates. A case study was chosen in order to develop a holistic understanding of the skills set required for sustainable employability by the engineering graduate.

3.5 DATA SOURCES

To gather primary and secondary data needed to answer questions posed in this study, four major sources were chosen for data collection, these are:

- Policy and curriculum documents, namely NC(V) and Nated.
- Technical College lecturers; six – two from each field, Mechanical, Electrical and Civil Engineering.
- Engineering graduates of Majuba TVET College presently employed, unemployed and self-employed; three – one from each field Mechanical, Electrical and Civil Engineering.
- Employers of Engineering graduates: three – one from each field, Mechanical, Electrical and Civil Engineering.

3.6 SAMPLING AND SAMPLING METHODS

In this study both convenience and purposive sampling is used. Leedy and Ormrod (2005) posit that qualitative researchers are intentionally non-random in their selection of data sources, as their sampling is purposeful. In addition, they go on to say that researchers select individuals that will yield the most information about the topic under investigation. A description of each sampling method is provided below.

Convenience sampling

Convenience sampling, according to Maree (2007, p. 177), refers to “situations when population elements are selected based on the fact that they are easily and conveniently available”. Convenience sampling (also called available sampling) is selected on the basis of being accessible or expedient (McMillan and Schumacher 2010, p. 137). Convenience sampling method is chosen on the grounds of proximity and affordability as I work at Majuba TVET College. The staff, graduates and potential employers are thus easily accessible. Information on unemployed graduates is available on the college database in the office of the work placement officer.

Purposive sampling

In this type of sampling, the researchers handpick the individuals to be included in the sample based on their judgement of the typicality or possession of the particular characteristics being sought (Cohen et al., 2011, p. 114). This is done in order to build up a sample that is satisfactory to the researchers’ specific needs (Cohen et al., 2013, p. 156).

The aim of purposive sampling will be to identify the relevant respondents who have the right information (Creswell, 2013). The participants in this study are also purposively selected as the staff teaching mechanical, electrical and civil engineering at Majuba TVET College, the curriculum used for engineering at Majuba College [Nated and NC(V)], graduates from the college (mechanical, electrical and civil) and employers who employ engineering graduates (mechanical, electrical and civil) from Majuba College. McMillan and Schumacher, (2010, p. 137) support such a choice because based on the researcher’s knowledge of the population, a judgement is made about which subjects should be selected to provide the best information, to address the

purpose of the research. Neuman (1997, p. 206) agrees that purposive sampling is appropriate when the researcher wants to select unique cases and use content analysis. Because this is a case study I will limit the number of participants for each human category of data source to three.

3.7 LOCATION OF THE STUDY

The study will be carried out in the town of Newcastle, northern KwaZulu-Natal at Majuba TVET College. Majuba TVET College has four campuses that offer both NC(V) courses and Nated. The courses offered include Office Administration, Marketing, Economics and Financial Management, Business Management, Civil Engineering, Engineering and Related Design, Electrical Infrastructure Construction, Hospitality and Catering, Tourism, Farming Management, Chemical Engineering, Rigging, Safety in Society, Human Resources Management.

Majuba TVET College has a very wide catchment area from Mpumalanga province, stretching down to the deep rural areas within KwaZulu-Natal province. The students come from various socio-economic backgrounds. Some student come from Newcastle whilst others come from rural areas and surrounding towns. There are students of different races and cultures, include Africans (who are the majority), whites, coloureds and Indians.

3.8 ETHICAL CONSIDERATIONS

Ethics define what is or is not legitimate to do, or what “moral” research procedure involves (Neuman, 1997, p. 443). Ethics thus talks about acceptable or unacceptable behavior in research. Wassenaar (2006, p. 35) states that, “ethical research practice ensures that the dignity of human participants is respected and is not abused or violated in the search for knowledge, scientific progress, or, more mundanely, for career advancement”. The researcher must therefore get informed consent from respondents before collecting any information from them. The process should take place in the comfort of the respondents’ space, with room for respondents to refuse to participate or withdraw at any time.

It is mandatory to maintain strict confidentiality and anonymity of the respondents, and this must be stated on the consent form that the respondent reads before agreeing to take

part in the research. Cohen et al. (2011) maintain that the essence of anonymity is for no information provided by participants to reveal their identity.

Ethical consideration is important in order to prevent loss of dignity, privacy, self-esteem and independence of the respondents. Shamoo and Resnik (2009) state that when conducting research on human subjects, harms and risks should be minimised but respect, human dignity, privacy, and autonomy should be maximised. The data interpretation should not be biased. The reporting of data and results must be honest, without fabricating, falsifying, or misrepresenting data (Shamoo and Resnik, 2015). It is in the interest of research that the researcher reports everything that happens in the research without selecting favourable information. Neuman (1997) propounds that ethical research depends on the integrity of the individual researcher and his values.

Gaining access

Gaining access means dealing with various gatekeepers at each stage of the research. It is often one of many problems facing researchers aiming to carry out in-depth qualitative case study research into organizations, and frequently a considerable amount of time is spent on this task (Patton, 2002; Shenton and Hayter 2004). Formal permission to conduct research was obtained from UKZN's research office and the office of the Rector of Majuba TVET College. Informed consent to participate in the study was acquired from Majuba lecturing staff, graduates and employers. Participants were made aware that they could withdraw from the study at any time they preferred to, they were guaranteed confidentiality and anonymity. Appointments were scheduled with participants well in advance, in order to deliver and retrieve the completed questionnaires.

3.9 INSTRUMENTS

The following instruments were used to capture data to answer the two research questions posed: document analysis, questionnaire, semi-structured interview. The reason for using the instruments mentioned was that they were suitable instruments to be used to collect qualitative data and answer the research questions posed, as is explained in the next sections.

3.9.1 Document analysis

The Jansen and Reddy's (1994) tool was used to analyse documents, namely the NC(V) and Nated TVET policies. Document analysis is defined as a strict and systematic set of procedures for the rigorous analysis, examination and verification of the contents of written data (Cohen et al., 2007, p. 475). The skills set required for sustainable employability by Majuba TVET college graduates depends on the curriculum that they studied.

3.9.2 Questionnaire

A questionnaire is defined as a written set of questions (McMillan and Schumacher 2010). Cohen et al. (2007, p. 321) state that in a site-specific case study qualitative data gleaned from less structured, word-based and open-ended questionnaires may be more appropriate, because they can capture the specificity of a particular situation. An open-ended questionnaire was used for TVET lecturers, employers and graduates because this is a qualitative case study. This type of questionnaire is used because it does not limit possible answers. Neuman (1997) maintains that open-ended questionnaires permit creativity, self-expression and richness of detail. Cohen et al. (2007, p. 320) propose that the smaller the size of the sample, the less structured, more open and word-based the questionnaire may be. The questionnaires in this study were first piloted with a group of TVET engineering lecturers to check the clarity of the questionnaire items, eliminate ambiguities or difficult wording. The outcome of the piloting indicated that the questionnaire items had good construct validity.

Each respondent was contacted telephonically to set up an appointment to explain the purpose of the study and the ethical considerations that I would adhere to, to deliver the questionnaire and set up timeframes for its collection. The questionnaire was used as the first instrument, to allow me the opportunity to later probe participants' responses in the interview.

3.9.3 Interviews

A semi-structured interview was used as the second instrument as it allowed the researcher to probe the participants' responses from the questionnaire. The interview questions were given to participants in advance so that they could prepare their responses. The interview allowed people to answer in their own terms, voicing their

own views, values and experiences. Neuman (1997) says that face-to-face interviews have the highest response rates and permit nonverbal communication and the use of visual aids. There is also a chance to rephrase a question and use extensive probe and follow up questions where the respondent gives ambiguous answers. This can stimulate an informant to produce more information. However, Neuman (1997) cautions that interviewer bias is greatest in a face-to-face interview. Thus the researcher needs to take great care to let respondents give their own responses without putting words in their mouths. Over all, the success of this interview technique rests upon the interviewer's ability to establish a rapport with participants so that they can open up and contribute meaningfully. Galetta (2013, p. 48) emphasises that this also requires some discipline on the part of the researcher; to allow space for the narrative to develop, holding back some questions until the participant has covered sufficient ground in the responses. All interviews were audio recorded.

3.10 DATA GENERATION

Data was generated and collected in four phases, as depicted in the table below.

Table 1: Data collection fitness of purpose

Phase of data collection	Data source	Instrument	Research question/s targeted	Purpose of phase	How data will be analysed
1	Majuba engineering curriculum	Document analysis: Jansen and Reddy(1994) tool: focus on: context, recommendations, SKAV, implementation	What skills set do Engineering graduates need for sustainable employability as recommended by: the Nated/NC(V) curriculum/policy?	To obtain policy perspective on sustainable employability skills	Document analysis: using Jansen and Reddy tool and conceptual framework content and thematic analysis
2	Engineering staff at Majuba- 6 altogether (2 from each field Mechanical, electrical & civil engineering) Employed Engineering graduates from Majuba (3). Unemployed graduates (3) Graduates who are	Questionnaire; Semi-structured interview	What skills set do Engineering graduates need for sustainable employability as perceived by: Engineering staff and graduates from Majuba TVET college?	To obtain staff and graduates' perspective on sustainable employability skills	Content analysis using conceptual framework and thematic analysis

	entrepreneurs (3)				
3	Employers of Majuba engineering graduates (3)	Questionnaire Semi-structured interview	What skills set do Engineering graduates need for sustainable employability as perceived by employers	To obtain employers perspective on sustainable employability skills needed by graduates	Content and thematic analysis
4	Data from phases 1-3	Data juxtaposed using Singh- Pillay (2010) notion of interface	Is there an interface as defined by the above stakeholders? If so, what is its nature	To establish if an interface exists in terms of sustainable employability skill for engineering graduates from Majuba TVET college and then describe the nature of the interface	Juxta-POSE data. Thematic analysis

The relationship among the different data sets is shown below in Figure 3.

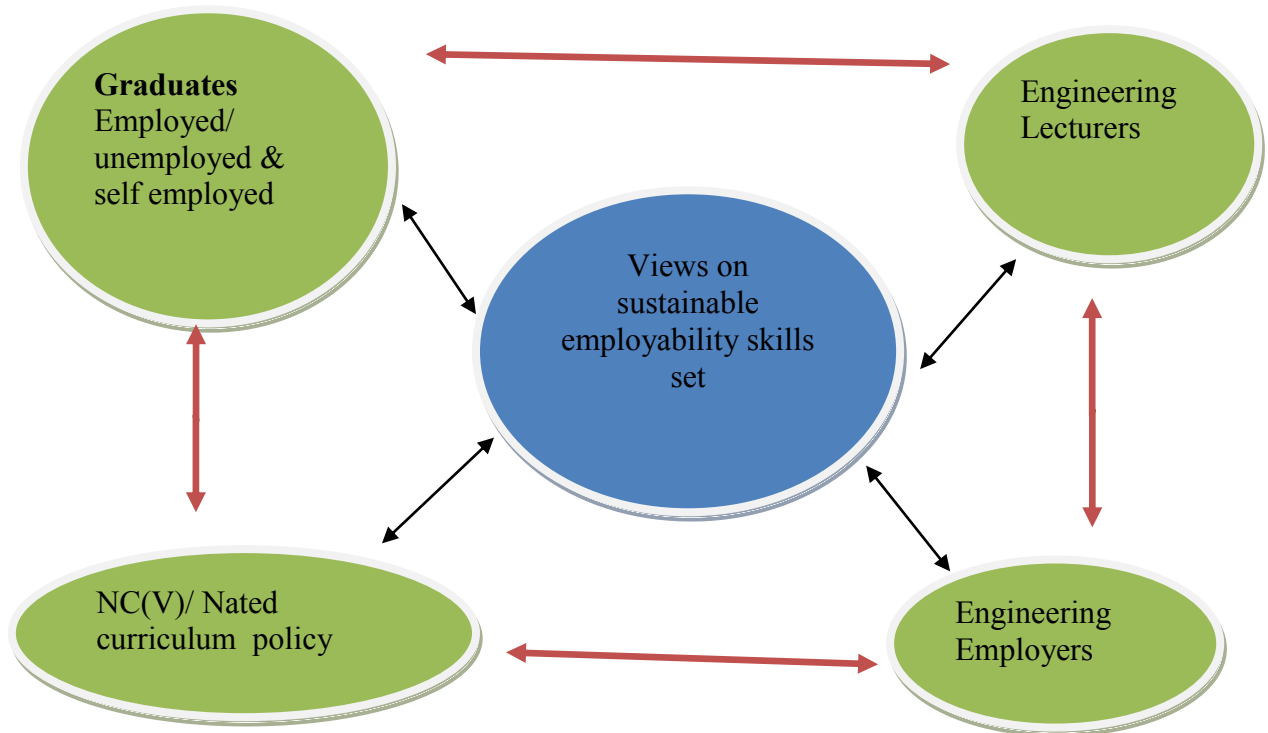


Figure 3: Fitness of purpose for data collection

The figure 3 on the previous page illustrates the flow of information from the respondents. It summarises the information flow given in table 1 (page 44). The arrows linking the respondents show the connectedness of the role players which illustrates that each part relies on the other for them to achieve positive results.

3.11 DATA ANALYSIS

Three steps of data analysis were followed, as outlined below.

Step 1: Research question 1: What skills set do Mechanical, Electrical and Civil Engineering graduates need for sustainable employability as recommended by the NC(V) or Nated curriculum or policy statements.

To answer this question, I used document analysis, to determine what the policy and curriculum documents say about the employability skills required by graduates of Technical Colleges. The analysis was guided by Jansen and Reddy's (1994) ideas on policy document analysis. There are four items considered while using the Jansen and Reddy's tool for policy document analysis, as follows

Context: This refers to the historical background of the document and the purpose behind its production.

Recommendations: Recommended sustainable employability skills, the rationale, conception and the desired objectives to be met through the recommended employability skills.

SKAV: Skills, knowledge, attitudes and values that will be developed through the recommended employability skills.

Implementation: Measures to be taken to ensure successful implementation of the recommendations.

For this study only two items of Jansen and Reddy's tool will be used, viz. Context, and Implementation. To analyse the skills sets Figure 1 of my conceptual framework (see section 2.7) was used to see which of the three pillars was being foreground in the development of sustainable employability skills.

Step 2: Research question: What skills set do Mechanical, Electrical and Civil Engineering graduates need for sustainable employability as:

- Perceived by Engineering staff and graduates from Majuba TVET College?
- Conceived by the engineering industries?

Data obtained from the questionnaires and interviews was subject to content and thematic analysis according to Figure 1 of my conceptual framework.

Step 3: Research question: Is there an interface as defined by the above stakeholders? If so, what is its nature?

Data collected from steps one and two was juxtaposed. Singh-Pillay's (2010) notion of interface was used to identify points of convergences or divergences in terms of sustainable employability skills. The nature of the interface was then ascertained by examining the factors that contributed to refractions at the points of convergences and divergences.

Research rigour, as indicated by validity and reliability, was maintained by engaging in member checking, triangulation and retaining thick descriptions.

3.11.1 Validity:

In qualitative data, validity might be addressed through the honesty, depth, richness and scope of the data achieved, the participants approached, the extent of triangulation and the disinterestedness or objectivity of the researcher (Winter, 2000). Validity is defined by Neuman (1997, p. 141) as part of a dynamic process that grows by accumulating evidence over time and without it, all measurement becomes meaningless. In brief, McMillan and Schumacher (2010, p. 104) describe validity as the truthfulness of findings and the degree to which the explanations are accurate. The perspectives, opinions and attitudes of respondents can also contribute towards validity of data. In this view, Agar (1993) in Silverman, (1993) claims that in qualitative data collection, the intense personal involvement and in-depth responses of individuals secure a sufficient level of validity and reliability. As researchers are themselves part of the world being researched, Cohen et al. (2007) echo that validity, therefore, attaches to accounts, not to data or methods, and that validity requires the researcher to be as honest as possible to the self-reporting of the researched.

Shuttleworth (2008) explains validity as encompassing the entire experimental concept to establish whether the results obtained meet all the requirements of the research method. The author further explains that validity in qualitative data might be addressed through the honesty, richness and scope of the data achieved, participants approached and the disinterestedness of the researcher. In order to ensure validity of data the researcher ensured he explained the purpose of the research clearly to the respondents, and ensured their anonymity and confidentiality of responses.

There are different types of validity including content validity, and external validity. In this study the researcher used content validity, which is often considered when a researcher wants to assess people's achievement in some area, or knowledge they have learnt during classroom instruction, or the job skills they have acquired in a program (Leedy and Ormrod 2005, p. 92).

The researcher ensured external validity by considering a real-life setting, where Majuba TVET college engineering graduates, lecturers and engineering companies were used as respondents. Because the courses offered in all public TVET colleges are the same and are all funded by the government, the results obtained in this study become more valid in the sense that they can yield findings with broader applicability across similar situations in South Africa.

In order to ensure validity (3.11.1), I made certain that there are adequate resources to collect data and made all necessary arrangements. Questionnaires and interviews were used to gather the required qualitative data carefully from graduates, lecturers and employers. In the interviews, the researcher allowed participants to speak freely without interruptions and so ensured that the environment contributed positively towards data collection. The data was accurately reported so that the message of the respondents was not distorted.

3.11.2 Reliability:

Cohen et al. (2007) describe reliability as a synonym for dependability, consistency and replicability over time, over instruments and over groups of respondents. It is explained further as a fit between what researchers record and as data, and what actually occurs in

the natural setting that is being researched. In order to ensure reliability of this study, the researcher was as consistent as possible when gathering data from all respondents. The researcher used his teaching experience to get the attention of the participants and get focused on data collection. This implies that the researcher should have been able to avoid any form of bias towards the responses of the participants. An atmosphere conducive to participants was created to avoid influencing their responses. This was achieved by keeping to time frames and the predetermined plan of action. Neuman (1997, p. 147) supports the contention that the method of conducting a study and so the results from it can be reproduced or replicated by other researchers. Accordingly, the researcher used the same instruments and ensured consistency throughout the process. Reliability was also improved by ensuring that my expectations and opinions did not influence the responses of the respondents. I obviously have my own preconceived ideas but they should not have affected the flow of information from participants. Nevertheless, it is argued by Hitchcock and Hughes (1995) that because interviews are interpersonal, that is, humans interacting with humans, it is inevitable that the researcher will have some influence on the interviewee and, thereby, on the data.

I attempted to be always alert and clarify issues where participants give ambiguous responses so as to avoid forming misconceptions concerning respondents' views. In this vein, I also guarded against misunderstandings on the part of the participants on what the questions were asking so that the respondents could answer the intended questions. Silverman (1993) supports that it is important for each interviewee to understand the question in the same way.

3.11.3 Credibility:

According to Creswell (2013, p. 15) credibility of any research is obtained by detailed "rich thick" description of the setting, participants and themes that emerge. To enhance credibility, I provided detailed in-depth descriptions of the setting, participants and themes that emerged from the data. According to Patton, (1990) the credibility of the researcher is especially important in qualitative research, as it is that person who is the major instrument of data collection and analysis. Credibility is therefore seen as the correspondence between the way in which the researcher interprets and presents the research findings and the meanings and perspectives of the research participant (Merriam, 2009, pp. 213-215).

Consequently, I gave each participant an opportunity to refuse to participate in the research project thereby ensuring that the data collection sessions involved only those who were genuinely willing to take part and prepared to offer data at no cost. Shenton and Hayter (2004) emphasises that participants should be encouraged to be frank from the outset of each session, with the researcher aiming to establish a rapport in the opening moments and indicating that there are no right answers to the questions.

3.11.4 Member checking:

Member checking is a research procedure used to ensure credibility and validity of the research. According to Creswell (2013), member checking involves taking back the transcript from interviews and observations to participants and asking participants to check the accuracy thereof. It is an opportunity for participants to check and approve particular aspects of the interpretation of the data they provided (Doyle, 2007; Merriam, 2009). A more comprehensive meaning is given by Cohen et al., (2007, p. 136), saying “member checking involves respondent validation, to assess intentionality, to correct factual errors, to offer respondents the opportunity to add further information or to put information on record; to provide summaries and to check the adequacy of the analysis. In this process, participants were given the opportunity to elaborate, clarify or confirm aspects of the interview in order to ensure that their views, experiences and observations are used to enhance the credibility of the research. Creswell (1998, p. 191) stresses that member checking is best done with “polished” interpreted pieces emerging from the data rather than the actual transcripts. McMillan and Schumacher (2010, p. 331) comment that member checking can also be done within an interview as responses are rephrased or probed to obtain more complete and subtle shades of meaning. The researcher thus used the questionnaire and rephrased some of the questions in the interview to enhance validity. In order to ensure member checking (Carlson, 2010) posits that data should be continually revisited and scrutinized for accuracy of interpretation and for meaningful, coherent conveyance of the participant’s narrative contributions.

3.11.5 Triangulation:

Triangulation is a process used to ensure validity in research by cross checking or juxtaposing data from different sources. Triangulation is used to increase credibility and

check dependability by obtaining information from different sources to form consistent themes in the study. In this study the researcher took the engineering lecturers' contribution to the semi-structured questionnaire and interview. The same methods were exercised for the engineering employers and engineering graduates. This was aimed at gathering as much detail as possible, which could then be cross checked to ensure validity. Denzin and Lincoln (1994) explicitly describe triangulation as a way of checking out the consistency of different data sources by comparing and cross-checking the consistency of information derived at different times. For example, by comparing observational data with interview data; or comparing what people say in public with what they say in private; checking for consistency in what people say about the same thing over time; compare the perspectives of people from different points of view (Creswell, 1998, Lincoln and Guba, 1985; Patton, 1990). Triangulation is seen as a way of sourcing information from multiple sources for the purpose of validity and reliability (Carlson, 2010; Cohen et al., 2007; Creswell & Miller, 2000).

3.12 LIMITATIONS OF THE STUDY

Leedy and Ormrod (2005, p. 135) comment: “sometimes researchers focus on a single case, perhaps because its unique or exceptional equalities can promote understanding or inform practice for similar situations”. The study is limited to Majuba TVET College with the assumption that the general set up of colleges is the same. The sample used is small, so results may not be generalized to the whole population. However, Neuman (1997, p. 331) supports that, “the researcher may gather a large amount of information on one or a few cases, go into greater depth, and get more details on the cases being examined”. McMillan and Schumacher (2010, p. 345) describe a case study as, “an instrumental case which provides an insight into a specific theme or issue with an in-depth understanding of the single phenomenon”.

Comprehension of English language by graduates may be a barrier because experience shows that many students struggle to understand English. In order to overcome this challenge, I simplified sentence construction in the questionnaires and used simple, easily understood words during the interviews. The lack of research awareness from respondents may also limit the flow of the process. In this regard, it was anticipated that some graduates may have never before experienced such an exercise. It was possible

that some may have misconstrued the research interview as an opportunity for employment.

Some employers have strict policies on the prohibition of cameras on site in order to protect their own interests. Furthermore, because their business is their priority, responses may not be timeous as expected. The researcher was mindful of this fact and took necessary alternative action to circumvent it. Leedy and Ormrod (2005) conclude that a case study may be suitable for learning more about a little known or poorly understood situation which may be suitable for investigating how an individual or program changes over time.

The lack of financial support impinged on the progress of my thesis as frequent long distance travel to meet the supervisor and visit the library were limited. However to cope with the above limitation my supervisor constantly maintained contact with me via email and whatsapp.

3.13 CONCLUSION

This chapter discussed the interpretive paradigm and gave a description of the research design. The research methods were discussed in detail with particular reference to the context of the study and gaining access, the selection of participants, the use of open-ended questionnaires and semi-structured interviews as methods of collecting data, how I will manage my data as well as the methods I employed to analyse the data. The verification of the data, as well as ethical considerations were also discussed. In the next chapter I attempt to answer the two research questions.

Chapter 4

DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

In this chapter I present my research findings collected from the field and analysis of the data. According to Maree (2007, p. 99) qualitative data analysis tries to establish how participants make meaning of a specific phenomenon by analysing their perceptions, attitudes, understanding, knowledge, values, feelings and experiences in an effort to approximate the construction of the phenomenon. Accordingly, the data will be analysed here in order to describe the perceptions, attitudes, feelings, experiences etc of the participants, in order to answer the research questions. The research findings are presented in the sequence of the research questions, to show how they are answered.

The research questions that guide this study are:

What skills set do Mechanical, Electrical and Civil Engineering graduates need for sustainable employability as:-

- a) Recommended by the NC(V)/Nated curriculum/policy?
- b) Perceived by Engineering staff and graduates from Majuba TVET College?
- c) Conceived by the engineering industry employers?

Is there an interface as defined by the above stakeholders? If so, what is its nature?

In this chapter I will first show the content analysis of policy and curriculum statements, to answer research question 1a. Data from the questionnaires and interviews will then be analysed. This will provide answers for research questions 1b and 1c. Finally I juxtapose all the information on the skills identified; thereby answering research question 2 in chapter 5.

4.2 RESEARCH QUESTION 1A

To answer this research question: What skills set are needed by graduates for sustainable employability as recommended by curriculum/policy? I analysed the policies: NC(V) and Nated. As mentioned in chapter 3 (see section 3.11) Jansen and Reddy tool for document analysis was used specifically for context and implementation of curriculum. To analyse the skills needed for sustainable employability I used my conceptual frame (see section 2.7).

4.2.1. NC(V) Curriculum

Context

The NC(V) document was produced in 2006 to replace the Nated programme, which was considered to be outdated. The purpose of the new curriculum was to cover the gaps which had been identified on the Nated courses, such as the absence of practicals and short period of delivery (Ten weeks per trimester). Its stated purpose was to:-

- Provide both theory and practical experience in various vocational fields;
- Add value to the graduate in terms of enrichment of the person and provide the qualifying graduate with applied competence and a basis for further learning; and
- Benefit society and the economy by promoting lifelong learning.

Recommendations for implementation

It is recommended that a minimum entry requirement of Grade 9 or equivalent is required for NC(V) level 2. The duration of each level is one year and a total of three years is allowed for completion up to level four. On completion of level four it is assumed that a graduate should be able to enter the world of work, or enter higher education.

Recommendations for technical trades in three fields of engineering

The policy covers some of the following technical trades in three fields of engineering:

Civil Engineering:- Carpentry & Roof Work; Concrete Structures; Masonry; Plumbing; Roads; Drawing Office Practice; Civil & Structural Steel work Detailing; Engineering Graphics & Technology and Construction Planning.

Electrical Infrastructure Construction: - Electronic Control & Digital Electronics; Workshop Practice; Electrical Workmanship and Electrical Systems & Construction.

Mechanical (Engineering and Related Design):- Automotive Repair & Maintenance; Engineering Fabrication; Fitting & Turning; Refrigeration Principles; Welding; Automotive Repair & Maintenance; Engineering Fabrication – Sheet Metal Work; Refrigeration Practice; Engineering Fabrication - Boiler making and Refrigeration & Air-conditioning Processes.

Basic skills foregrounded by NC(V) Policy

From the NC(V) document, the following basic skills are identified, according to the three engineering fields. It can be seen that although there are many different technical trades offered under the NC(V), the sets of generic skills is relatively small.

Civil:- Roofing; bricklaying; plumbing; plastering; tiling; reading drawings; carpentry; measuring and levelling; communication skills; setting out; costing; report writing and computer literacy.

Electrical:- House wiring; tubing; reading drawings; fault finding; communication skills; report writing and computer literacy.

Mechanical:- Maintenance; machining (milling, turning, drilling, grinding) welding; communication skills; report writing; ethical responsibility to community; computer literacy developments; troubleshooting; measuring; housekeeping skills and machine setting.

The basic skills listed above are necessary fundamentals required by a tradesperson. It is evident that fully equipped workshops are needed for teaching such skills as listed above. For all the basic skills, qualified lecturers with adequate learning resources are also necessary. Of course, well-groomed learners will assist in attaining these skills set.

According to the conceptual framework in chapter two, the listed skills above such as roofing, house wiring and maintenance are embraced in the economic pillar to satisfy essential needs for jobs, income, food, social security, and consumption opportunities. The NC(V) policy also makes mention of providing opportunities for and encouraging lifelong learning for learners.

The second pillar of the conceptual framework, the social aspect, is illustrated by housekeeping. Good housekeeping entails behaving in a manner which is socially acceptable in that particular work environment.

The other basic skills foregrounded in the policy are: maintaining a tidy work environment; cultivating skills, disciplines and capacities necessary for reconstruction and development. These cover the environmental pillar which reinforces the environmental protection to conserve and enhance the resource base and to keep the environmental limits for a long term perspective.

4.2.2. Nated policy

Context

This policy document was conceptualised within the apartheid framework, and put in place in the early 1980s - 90s with the aim of training manpower for vocational trades. As such, it gave effect to the kind of qualification (through parallel work experience) offered and the student body catered for at the time, i.e. Blacks (Africans), Whites, coloureds and Indians (DoE, 2002).

Recommendations for implementation

The minimum requirement of entry to the programmes is also Grade 9, which is the same as for the NC(V) programme. However, the focus of delivery is more on theoretical approach rather than a practical outcome. The principles taught must be applicable to a particular vocation or industry.

The policy states that colleges educate people directly or indirectly for entry into particular occupations, with provision for and development of personnel for promoting and practicing technology. Furthermore, it states that the curriculum should enforce a

sense of duty and responsibility, so that the individual will deal meaningfully with problem situations, act with human dignity with integrity and a stable character. This aspect falls under the social pillar of my conceptual framework.

Recommendations for technical trades in three fields of engineering

The National Education Policy on Nated programme foregrounds trade skills in the three engineering fields as follows:-

Mechanical: - Fitting and Machining; Boiler making; Welding; Fabrication; Motor, Diesel & Tractor Mechanics; Motor Body Repairing and Mechanical Draughting.

Electrical: - Electrical Principles & Practice; Electronic Control & Digital Electronics; Workshop Practice; Electrical Workmanship; Electrical Systems & Construction; Electrotechnology and Instrumentation Technology.

Civil:- Building & Structural Surveying; Plastering; Plumbing; Tiling; Quantity surveying; Building Administration; Building Drawing; Multi-Disciplinary Drawing Office Practice and Building & Structural Construction.

The effective teaching and learning of the trades will foster understanding and acquisition of competencies necessary for employability and self-reliance. The above skills such as engineering drawing, wiring and supervision are encompassed in the economic pillar of my conceptual framework in order to satisfy their needs for jobs and income. Housekeeping is embraced in the social pillar where greater safety, improved workflow and worker/customer satisfaction are promoted. The environmental pillar skills were not embraced by the Nated policy.

4.3 RESEARCH QUESTION 1B

This section presents the findings from TVET engineering lecturers and graduates regarding the skills sets identified as needed for sustainable employability. The data presented here was obtained from the open-ended questionnaires and semi-structured interviews (see appendices 4, 5 and 6), as described in Section 3.9. The six TVET

College lecturers taught in the disciplines of mechanical, electrical and civil engineering. The engineering graduates (3 in each field) involved were equally distributed among those who were employed, unemployed, or self-employed. The findings from the Engineering lecturers will be presented followed by those from the graduates.

4.3.1 Engineering Lecturers

The mechanical, civil and electrical lecturers identified many skills, as follows:-

Mechanical: Analytical skills, creativity, problem solving, safety, machine operations, ability to read and draw engineering drawings, use of AutoCAD.

Civil: Engineering drawing, design, mathematics, trouble shooting, brick laying, computer skills, plastering, roofing, tiling and painting, setting out, measuring, bills of quantities.

Electrical: General knowledge, basic hand and power tools, electrical symbols, Drawing knowledge, House wiring, Automation-installing remote controlled gates, garage doors,

All six lecturers emphasise the need for - problem solving, communication skills, computer skills.

Lecturer 1 responded that,

“...Analytical skills, creativity, problem solving skills are important. Problem solving skills are important because industry solves problems on a daily basis”.

In the same vein, lecturer 4 highlighted,

“Safety is important, machine operations, ability to read and draw engineering drawings and use of AutoCAD. There is need for comprehension in engineering systems like hydraulics, pneumatics, drives, and mechanisms”.

Lecturer 3 stated that,

“The graduates must have skills in computer (AutoCAD/Ally CAD) to help them read and draw plans”.

The above is confirmed by lecturer 6 saying,

“...computer skills and CAD are important”.

Lecturer 3 reiterated,

“...whatever option that the student takes it is mandatory that the core subject is passed as it offers the main guide for the career path”.

Lecturer 2 said,

“...ability to read electrical drawings and house plans will enable one to understand wiring of circuits and houses”. The use of tools was emphasised.

Lecturer 5 stressed,

“...house wiring, automation, problem solving, computer and communication skills are vital”.

The responses above reflect the wide range of practical skills set required by TVET college graduates for them to earn sustainable employability. Lecturers 2, 3, 4 and 6 alluded to drawing skills as important skills since they are a way of communication and instruction in industry. There is a strong connection shown between theory and practical as lecturer 6 for civil mentions as important skills:

“...the ability to draw plans ...setting outmeasurement”.

Similarly, electrical lecturer 5 agrees that,

“...House wiring, automation, installing remote controlled gates and electric garage doors are skills needed for sustainable employability in the engineering industries”.

4.3.2 Engineering Graduates

Data from the questionnaire reveal the following skills listed below are needed for sustainable employability from the perspective of graduates in the three fields of engineering.

Mechanical: Safety skills; Machine operations and correct tool handling; engineering drawing; Drawing; measuring; squaring; safe use of tools; fabrication; welding and joining methods.

Electrical: Hand tools skills; install, design and develop starters and motors from drawings and reading drawings.

Civil: -Plumbing; building and masonry; supervision of workers; calculations, planning and budgeting; The usage of tools; handling skills; hand tools; supervision; ability to calculate, plan and budget.

The interviews conducted with the graduates support the skills sets listed above.

Graduate 1:

“... Machine operations and correct tool handling were learnt which I didn't know before”.

In support Graduate 2 said,

“... Learnt how to use the tools and machines and apply the safety rules ...”

Furthermore, Graduate 3 added,

“... Drawing, welding and safety risk are important in order to get employed”.

In addition, Graduate 4 echoed that,

“...Hand tools skills are very important. It is difficult to work without knowing hand tools”.

Graduate 5 affirmed,

“...Plumbing, building and masonry are important skills that I am currently using now in civil engineering”.

Similarly, Graduate 6 said,

“...Maintain, install and repair all electrical equipment, designing and wiring develop starters and motors by referring to the drawings. Ability to read drawing is very important”.

Graduate 7 reiterated that,

“...Knowledge to supervise workers, ability to calculate, plan and budget are important skills. Safety is a requirement that every employee should have in order to work safely. The usage of tools like spirit level and fish line are the basic tools for a builder and their usage must be mastered”.

Graduate 8 said,

“...I consider work skills such as handling skills, hand tools involved. You need to know the work practically. Workshop exposure in the workshop is more important as there is a big gap between class theory and industry work environment”.

Lastly, Graduate 9 echoed,

“...measuring, squaring, safe usage of tools and welding are basic important skills. In addition, you should know the types of materials and joining methods. Different types of welding like MIG, TIG, aluminium welding and welding methods. Methods of cutting materials using different methods such as hacksaw, power saw, guillotine, oxy acetylene punching machines and more”.

The responses from the excerpts above show that the three fields of engineering (mechanical, electrical and civil) have specific important skills which must be mastered in order to cultivate an artisan route. However, it has been seen that there are also generic skills which are applicable in all the three fields, such as safety, drawing, and calculations.

4.3.3 Summary of Skills Identified by Engineering Lecturers and Graduates.

Engineering lecturers from Majuba TVET College identified certain skills that they believed were needed by Mechanical, Electrical and Civil Engineering graduates to ensure sustainable employability. There were overarching citations of AutoCAD, and the ability to draw and interpret drawing as important skills. Clearly, in the mechanical, civil and electrical fields, drawings must be understood and translated into an actual item. Thus the skill of working with technical drawings is an essential pillar to simulation or translating an idea into reality. Other important skills for sustainable

employability are analytical skills, problem solving, automation, house wiring, hand tools usage and machine operations. The problem solving skills were highlighted as important because in industry personnel must solve problems daily. The skills emphasised by the Majuba TVET lectures overtly embrace the economic pillar of my conceptual framework. However, in an inconspicuous way the lecturers foreground certain skills pertaining to the social pillar of my conceptual framework such as the need for problem solving skill, communication skills, computer skills which are inevitably linked to being a lifelong learning and self-reliance. Lecturers seem unaware of the need to embrace green technologies hence they do not embrace the environmental pillar of sustainable development in their teaching.

The engineering graduates from Majuba TVET College identified the skills set that they perceived was needed by Mechanical, Electrical and Civil Engineering graduates for sustainable employability. There were similarities in the skills set required by the graduates across the three fields of mechanical, electrical and civil. The graduates mentioned safety, ability to interpret drawings, the use of hand tools and machines specific to each trade. Other skills, such as maintenance and welding, were common among the mechanical respondents as they exemplify their daily routine. The self-employed participants gave responses, such as knowledge to supervise workers, and pricing and budgeting, which they indicated had been learnt through the NC(V) curriculum. Graduates are more concerned with mastering skills that will gain them employment and hence emphasise skills related to the economic pillar of sustainable development.

4.4 Research question 1C

The perceptions of employers within the engineering industry regarding skills needed by engineering graduates for sustainable employment was gleaned from the questionnaires and interviews (appendices 12, and 13). The employers represented the three fields of mechanical, electrical and civil engineering. The skills identified from both questionnaires and interviews were:-

A good knowledge of engineering drawing; quality work; conforming to standards; working within given time frames; Safety; A proper background of the trade is required

which is N3 with a minimum pass of 50% in Maths and Science; A trade theory subject; Developments; platters drawing, Welding:-arc, CO₂, MIG, TIG. Measuring; leadership; initiative; customer focus; negotiation and consultation; communication; writing skills; organized; co-coordinating; team leader; problem solving and time management. Knowledge of relevant skills development legislation is also important.

The following personality traits were deemed as essential in employees: -

Being a self-starter; independent; friendly; well organized; quick learner; good judgment; creative; flexible and outcomes and goal directed.

The interviews conducted with employers revealed the following:-

Employer 1 echoed that,

“Safety is the first important aspect taught so that they can work safely, think safely and have safety as a priority. Safety is indoctrinated into everyone. The basis must be properly laid so that they have an understanding of what career they enter into. A lot of school leavers want to become millwrights, electricians, boiler makers and fitters but they know nothing about what the trade entails”.

In a few words that employer 2 said,

“A good knowledge of engineering drawing is required, production of quality work, conforming to standards, working within given time frames and be able to meet delivery dates”. In addition he stated that, “experience is required but the students do not have it”.

Employer 3 said,

“Students bring papers but when it comes to production that person cannot cope with the work. It is difficult to facilitate training if someone lacks skills because everyone is there for production. A company trains people according to the needs of the company so that they can produce as required. Some companies use those graduates for sweeping and carrying things from place to place because they cannot afford time to give proper training”.

Engineering industries perceive a need for specific skills from Mechanical, Electrical and Civil Engineering graduates for their sustainable employability. The employers also displayed their versatility in their respective fields of expertise of mechanical, civil and

electrical. The skills identified included good knowledge of engineering drawing; a proper background of the trade is required which is N3 with a minimum pass of 50% in Maths and Science; A trade theory subject of the related field of study is an added advantage which gives a fundamental understanding of what the trade is about; working within given time frames; meeting delivery dates; conforming to standards; safety so that they can work and think safely, and lastly quality workmanship.

One employer reiterated that it is difficult to facilitate training if someone lacks skills because every aspect of the business is there for production. It was further alleged that some companies use graduates for menial tasks because they cannot afford time to give proper training. Employers noted that many school leavers want to become millwrights, electricians, boilermakers and fitters, without knowing anything about the trade. In an interview it was noted that, “It seems those that come to college want to become electricians and when it is full then you redirect them to other fields. This shows that they do not know what they really want to become” (Interview Employer 1). This brings up the issue of career guidance which may not be happening or happening to the detriment of its intended beneficiaries.

There were some negative comments from employers about the curriculum which include: It is not in line with what industry has evolved; The curriculum is old; it needs to be aligned with what industry of today wants; It is currently entirely useless and it seems a lot of lecturers have not been in industry at all therefore understanding the concepts and being able to teach are different issues.

The interview with employers reveals that their primary interest is on the skills related to the economic and social pillar of sustainable development. They focus on imparting skills in line with their operations and they value time as well as safety. Employer 1 says, “Safety is indoctrinated into everyone”.

4.5 CONCLUSION

A document analysis of curriculum policy documents highlighted a set of skills which should be taught in TVET engineering courses. Then participant interview responses from engineering lecturers and graduates and then employers were analysed. The three aspects provided answers research question one. On the one hand, there are several similarities in the skills set required by the engineering graduate for sustainable

employability. On the other hand, some mismatches between stakeholders' views were noted which show a disconnection between lecturers, graduates, employers and the curriculum policy. This can impact on all the role-players as there should be an interconnection amongst all the stakeholders. They depend on each other for survival.

The skills set required for sustainable employability cannot be accomplished by one party without the other. Lecturers need a curriculum to follow during training whilst graduates can attribute their success to the lecturers' guidance through the educational tour. At the same time, the employer cannot stand aloof and turn a blind eye when all the efforts to train graduates are aimed at feeding employers with a productive workforce. Therefore all stakeholders must put their hands, and heads, together to eliminate the curriculum and delivery shortfalls so that the end product (a TVET engineering graduate) meets the minimum expectations of industry.

The skills so identified will be used alongside each other to answer research question two in the next chapter.

4.6 Summary of Research Question 1: responses from all data sources

Table 2 Skill set identified by stakeholders for sustainable employability

What skills set do Mechanical, Electrical and Civil Engineering graduates need for sustainable employability as:-				
Questions	1. Conceived by the engineering industries?	Recommended by Lecturers	Perceived by Engineering graduates	Recommended by the NC(V)/Nated curriculum/policy?
1. What skills set do you consider to be important for sustainable	Students bring papers but when it comes to production that person cannot cope with the work.	Analytical skills, creativity, -problem solving skills. - Problem solving skills to solve problems on a daily basis - correct usage of	1. What skills set do you consider to be important for sustainable employability? Please explain. - Safety skills.	Carpentry, & Roof Work, -Concrete Structure, -Masonry, -Plumbing, -Roads, -Drawing Office Practice, -

<p>employability? Please explain.</p>	<p>-It is difficult to facilitate training if someone lacks skills because everyone is there for production. -A company trains people according to the needs of the company so that they can produce as required. -Some companies use those graduates for sweeping and carrying things from place to place because they cannot afford time to give proper training. -bad attitudes -A good knowledge of engineering drawing is required. - quality work, conforming to standards. . Meet delivery dates. Experience, - A proper background of the trade is required which is N3 with a</p>	<p>hand and power tools. - ability to read Electrical drawings and house plans - understand wiring of circuits and houses. - computer skills (AutoCAD, Ally Cad) to read and draw plans. - Depending on the option that the student takes it is mandatory that the core subject is passed as it gives the main guide for the career path. -Safety -Machine operations -ability to read & draw engineering drawings -AutoCAD. House wiring -Automation -Problem solving -Computer skills -Communication skills Computer skill -people management -CAD -bricklaying -reading plans -Drawing plans -Use tools</p>	<p>- Machine operations and correct tool handling Learnt the use tools and machines and application of safety rules - Drawing is an important skill in engineering and safety. -Basic understanding from school. - Hand tools skills are very important. It is difficult to work without knowing hand tools. - Plumbing, building and masonry are important in civil. -Maintain, install, design and develop starters and motors from drawings. Ability to read drawing. - Handling skills, hand tools involved. - Knowledge to supervise workers. -ability to calculate, plan and budget. -Safety is a requirement that every employee should have in order to work safely. The usage of tools like spirit level and fish line are the basic tools</p>	<p>Architectural Graphics & Technology, -Civil & Structural steel work Detailing, - Engineering Graphics and Technology, -Drawing Office Procedures & Techniques, -Engineering Graphics & Design, -Mechanical Draughting & Technology. -Electrical Principles & Practice, -Electronic Control & Digital Electronics, -Workshop Practice, - Electrical Workmanship, -Electrical Systems & Construction, Mechatronics, -Electrotechnology, Introduction to Computers, -Manual Manufacturing, -Mechatronic Systems, -Electrotechnology, Stored Programme Systems, Machine Manufacturing, Mechatronic Systems, Electrotechnology, Stored Programme Systems Instrumentation, Instrumentation Technology.</p>
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	<p>minimum pass of 50% in Maths and Science.</p> <ul style="list-style-type: none"> - A trade theory subject of the related field of study is an added advantage which gives a fundamental understanding of what the trade is about. The basis must be properly laid so that they have an understanding of what career they enter into. - A lot of school leavers want to become millwrights, electricians, boiler makers & fitters without knowing what the trade entails. -Safety is an important aspect for workers -have safety as a priority -Safety is indoctrinated into everyone. -Old curriculum -Too short 		<p>for a builder and their usage must be mastered.</p> <ul style="list-style-type: none"> -measuring, squaring, safe use of tools, welding. Know types of materials and joining methods. Different types of welding like MIG, TIG, Arc, Gas, aluminium welding and welding methods. Methods of cutting materials using different methods such as hacksaw, power saw, guillotine, oxy acetylene and more. 	<p>Engineering Fundamentals, Engineering Practice & Maintenance, Engineering Graphics & Design, Materials Technology, Engineering Processes, Professional Engineering Practice, Automotive Repair & Maintenance, Engineering Fabrication, Fitting & Turning, Refrigeration Principles, Welding, Automotive Repair & Maintenance, Engineering Fabrication – Sheet Metal Work, Refrigeration Practice, Engineering Fabrication- Boiler making, Refrigeration & Air-conditioning Processes.</p>
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	training periods			
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Chapter 5

THE INTERFACE BETWEEN STAKEHOLDERS' SKILLS SETS

5.1 INTRODUCTION

In this chapter, I answer research question two: Is there an interface as defined by the stakeholders (policy, lecturers, graduates and employers)? If so, what is its nature?

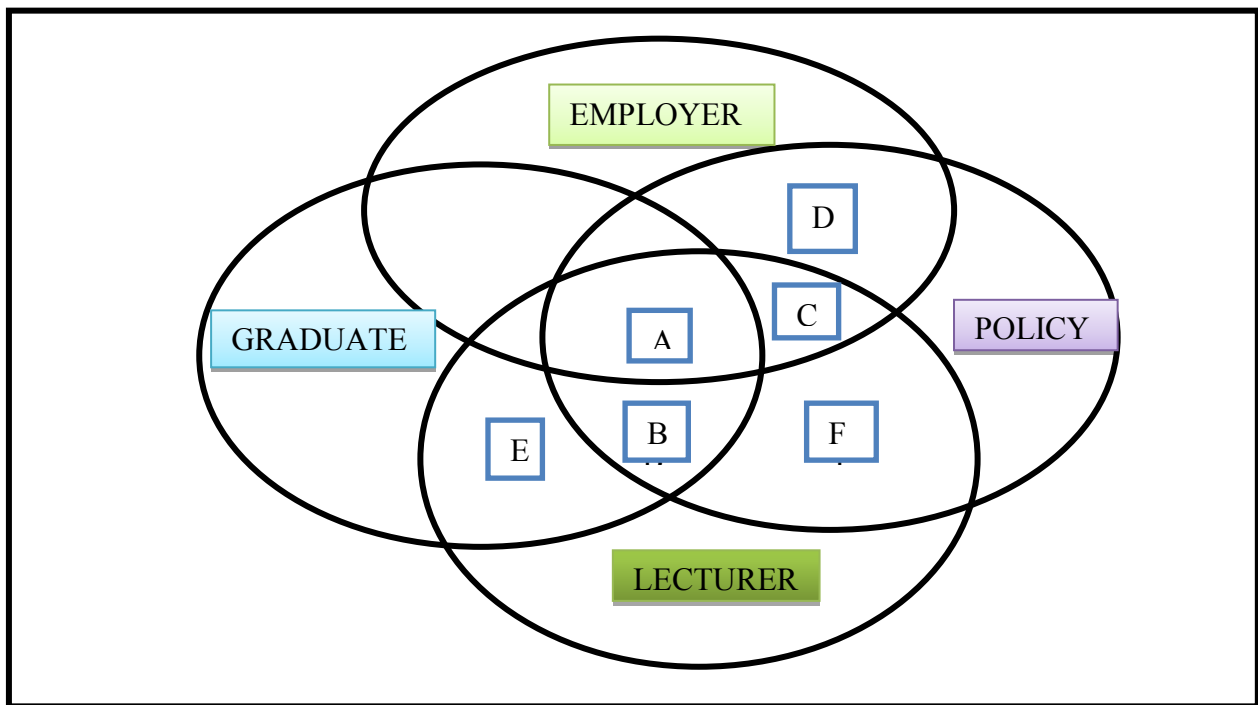
As mentioned earlier in chapters two and three, the interface according to Singh-Pillay (2010) arises out of the points of convergence and divergence amongst the different stakeholders' requirements in respect of skills development. This understanding is applied in this study. The concept of an interface is construed as a meeting point (convergence) or a point of deviation (divergence) amongst stakeholders with regard to the phenomenon explored.

I first discuss the interfaces that emerged, with respect to sustainable employability skills. Second, I present a cross interface analysis to bring to light the nature of these interfaces in terms of sustainable employability skills. I provide a précis to conclude the chapter.

5.2 RESEARCH QUESTION TWO: INTERFACES AND THEIR NATURE

5.2.1 Analysis of the skills set for sustainable employability Interface

In order to answer research question two, I will juxtapose the data gathered from curriculum or policy documents, lecturers, graduates and, employers so that I can establish if there is an interface in the skills set required for sustainable employability by the engineering graduates. In this section of the analysis I foreground the point of convergences to capture the interfaces that exist in terms of sustainable employability skills. Figure 5 represents the existence of interfaces among stakeholders.



KEY: Interfaces

A: Policy-Employer-Lecturer-Graduate Interface w.r.t. mechanical, electrical and civil skills.
 B: Policy-Lecturer-Graduate Interface w.r.t. safety skills.
 C: Policy-Lecturer-Employer Interface w.r.t. communication, problem solving and computer skills.
 D: Policy-Employer Interface; w.r.t. quality work and time management.
 E: Lecturer-Graduate Interface; w.r.t. machine operations; supervision of workers; correct tool handling and background knowledge.
 F: Policy-Lecturer Interface w.r.t. on analytical skills, creativity and problem solving skills.

As can be seen from figure 5 above some interfaces involve 4 stakeholders whilst others involve 3 or 2 stakeholders. The interfaces point to the points of convergences (agreements) amongst the stakeholders in terms of skills needed for sustainable employability.

5.2.1.1 The Policy-Employer-Lecturer-Graduate interface

This interface involves all four stakeholders. This means these four stakeholders concur on the type of skills set for sustainable employability required by the TVET graduate in the following trades: mechanical, electrical and civil skills.

Mechanical: Safety skills, Tool handling, Engineering Drawing and interpretation

Electrical: Safety skills, hand tool skills, Reading Electrical Drawing

Civil: Safety skills, handling skills, Reading and Drawing plans

5.2.1.2 Lecturer-Graduate-Employer Interface

This interface highlights the need for job specific skills. Three out of the four stakeholders agree that the skills that are essential for sustainable employability are as listed below:

Mechanical: Automotive Repair & Maintenance; Welding; Boiler making; Fabrication; Machining; Reading Drawings.

Civil: Carpentry & Roof Work; Plumbing; Bricklaying; Plastering; Reading drawings

Electrical: House wiring; tubing; reading drawings; fault finding; communication skills; report writing and computer literacy.

I see that drawings appear for all disciplines, whereas the others appear to be discipline specific.

5.2.1.3 The Policy-Lecturer-Employer Interface

The Policy-Lecturer-Teacher interface reflected points of convergences in terms of communication, problem solving and computer skills. This means that there were no skills identified as common to only these particular three stakeholders. So if skills were common to these three, they were also common to the graduates

5.2.1.4 Lecturer-Graduate Interface

The lecturers and graduates together consider the following skills as being vital for sustainable employability: machine operations; supervision; correct tool handling and background knowledge.

5.2.1.5 The Policy-Lecturer-Interface

The interface was found on analytical skills, creativity and problem solving skills.

5.3 ANALYSIS OF THE NATURE OF INTERFACE OF SKILLS SET REQUIRED FOR SUSTAINABLE EMPLOYABILITY

In order to describe the nature of the inference, I examined the reasons proffered by the stakeholders, via the interviews, for the contextual factors that shape or sculpt these interfaces.

5.3.1 Under qualified and inexperienced lecturers

Employers vehemently maintain that inexperienced and unqualified lecturers hindered the skills development in graduates as shown in the excerpt below:

“It seems a lot of lecturers have not been in industry at all therefore they lack the know-how and understanding of vital concepts and are unable to teach are different issues, as a result many graduate have gaps in their knowledge and cannot perform the jobs they are trained to do.” Employer 1 (see appendix 12 for interview transcript).

Lecturers seem also unhappy about their lack of exposure to and experience of industrial requirements, as reflected in the excerpt below.

“Lecturers are teaching because they cannot fit into industry. They do not have the experience needed to train individuals who can compete effectively on the job market. Obviously these lecturers are a liability to the system. Qualified and experienced lecturers leave teaching into industry for better offers. More surprisingly, none of the lecturers engage on technology degrees for staff development.” Lecturer 3, (see appendix 11 for transcript.)

The above finding concurs with that of Wedekind (2008) who posits that most lecturers with education qualifications have general qualifications or those related to school teaching, rather than qualifications designed for college lecturers. Likewise the DHET (2012, p. 24) also argues that the greatest challenge in improving and expanding TVET colleges is the capacity of lecturers, particularly their subject-matter expertise. Lecturers

drive curriculum delivery, which therefore means that they have to be knowledgeable in their respective trade and be able to offer meaningful training.

5.3.2 Unprepared students and strikes for NSFAS

(Rajalakshmi, 2013, p. 47) says,

“It is the paramount role of the youth to take part in the man machine interface. The need has arisen for every youth to deepen their talent base, sharpen their skill base and to widen their focus. The soft skill which amounts to the very basic skills nowadays needs to be whet. But it is quite pathetic that some students lack these very essential skills in spite of the efforts taken by the educational institutions to impart in the minds of the youth.”

Both lecturer and graduates mentioned students’ strikes as hindering the acquisition of the skills set required by graduates. It is alleged that students who are not ready to learn will incite violence and anarchy because they have nothing to lose, (see appendix 10 and 11).

One graduate said,

“The strike by students for NSFAS money is disturbing learning almost every term.” Graduate 4 interview, (see appendix 10).

A lecturer blamed the colleges when he said,

“...a weak recruitment criterion which takes students with poor passes.” Lecturer 5 interview, (see appendix 11).

I also observed such a strike at Majuba TVET College, in term two of 2015, which caused all full time Nated trimester examinations to be subsequently cancelled. This was because students had not studied appropriately OR had not had a chance to study appropriately. In support of this idea one lecturer echoed,

“The strike for NSFAS by students waste precious time.” Lecturer 6 interview, see appendix 11.

Along a different line, an employer commented on the preparedness of students saying,

“A lot of school leavers want to become millwrights, electricians, boilermakers and fitters but they know nothing about what the trade entails.” Employer 1 interview, see appendix 12.

The example above shows that there is no proper career guidance at the colleges, which hinders students from making appropriate career decisions.

The employer 1 further propounded that,

“A handful of students know what they want to do because if I really want to become an electrician I will not go to civil because that is where space is available.” Employer interview, see Appendix 12.

The opinion of the graduates reflects poor understanding of the prescripts of the trade skills assumed knowledge. This is supported in the excerpt below:

“It seems those that come to college want to become electricians and when it is full then you redirect them to other fields. This shows that they do not know what they really want to become. A handful knows what they want because if I really want to become an electrician I will not go to civil because that is where space is available.” Employer 1 interview, see appendix 12.

This attests to college procedures when enrolling students for courses. Their primary aim is to fill available spaces, rather than ensuring that student enrolls for their preferred career choice. The stated administrative behaviour of students being allocated to courses according to space available rather than aptitude or interest, does not promote the development of the required skills set for sustainable employability.

5.3.3 Poor Infrastructure and under resourced workshops

For skills to be fully developed, appropriate resources and qualified lecturers are essential. These resources include computers; workshops with functional equipment such as tools and machines; text books, visual aids and physical aids for items such as pumps, valves, circuits, panels and trusses. In this regard graduates stated that,

“Group practicals prevented hands on practice to some students.”
Graduate 6 interview, see appendix 10.

Freely available resources enhance appropriate skills development without improvising or taking short cuts. For instance, if the tools have to be shared, this can increase the total time taken to teach a concept. Obviously, less time is needed if all students use their own tools than if they have to share, which then means that teaching time is used more effectively to impart the requisite skills.

A civil engineering lecturer reiterated,

“Infrastructure like a shade for use when bricklaying is a necessity so that projects are not affected by the weather. Lecturer 6 interview see appendix 11.

A graduate also alluded to the same idea with the statement:

“Practicals are needed more at college in order to meet industry demands.” Graduate 3 interview, see appendix 10.

Besides the lack of resources, lecturers put forward that,

“Lack of the practical component for the Nated programme hampered lecturers’ duty as it is very difficult to explain certain concepts or processes without seeing.” Lecturer 2 interview see appendix 11.

From the perspective of the stakeholders, it is very important that the resources recommended by policy are provided so that effective teaching and learning can happen, thereby leading to the skills set required by the TVET graduate. A similar study by Legg-Jack (2014) highlighted some factors that impede effective implementation of the curriculum, such as lack of training materials and equipment, a dearth of qualified technical teaching and non-teaching staff, obsolete and non-functional equipment, lack of staff development and poor management of Technical Education.

5.3.4 The late release of results

Frequently examination results are released a week or two into the following term. Because the Nated programme runs for only ten weeks, it is not viable to lose up to two weeks each trimester. Registration cannot take place until the previous results are released, and registration itself may take another week. Such unproductive use of tuition time causes a lot of injustice to students effectively leaving an average of eight weeks being used fruitfully every trimester. Experience has shown that lecturers are under immense pressure to complete the course. So it is likely that there is no time to ensure appropriate understanding of the skills taught.

This loss of time has an enormous effect on time available for lecturing and planning. It should be addressed so that teaching and learning are allocated adequate time, to avoid keeping the lecturers under pressure, playing “catch-up” and to ensure the skills set for sustainable employability are received by graduates.

5.3.5 Lecturer-student ratio

The policy document states that the lecturer: student ratio should be 1:30 respectively. However colleges do not adhere to this ratio. There is a tendency to enrol high numbers of students for NC(V) because of the high subsidies received from government for these students. At the same time, Nated subsidies are very low, therefore colleges tend to enrol the maximum possible NC(V) students in order to maximise income.

The lecturer 6 voiced that,

“Sometimes the student numbers are too high to manage.” Lecturer 6 interview see appendix 11.

The high student numbers put a strain on the available resources, which negatively impacts on the ultimate results. It also affects the mode of delivery and more teaching time may be required to ensure understanding of the requisite skills.

5.3.6 Language barrier

It was observed through the interviews that the language barrier is a reality. The electrical lecturer forwarded the following:

“Language barrier bears negative effects.” Lecturer 1 Interview see appendix 11.

Language barriers can contribute to poor productivity, with mistakes being made or a general lack of trust between the employer and employees. All these could be avoided with clear communication. A general unwillingness among students and workers to speak English was observed and some workers felt intimidated and frustrated trying to communicate with English-speaking supervisors or co-workers. To ensure understanding, it important to seek feedback after instructions have been given, either orally or by demonstration, particularly during training so as to ensure the same message is shared across the student groups.

5.3.7 Political pressure

The introduction of NC(V) shows the heavy support from government. All public colleges offer NC(V) programmes across all fields, and students who meet the finance requirements, get study bursaries. Civil engineering lecturer 3 showed some displeasure with political pressure and said,

“Political pressure forces colleges to succumb to demands of recruiting undeserving students into TVET colleges.” Lecturer 3 interview see appendix 11

The NC(V) programme is still not widely understood by some industry, as observed during the interviews. Advocacy is required to ensure that all stakeholders have a common understanding of NC(V).

5.3.8 Policy discrepancies

The two policies, of NC(V) and Nated, have very different methods of delivering content. The Nated curriculum is 100% theoretical whilst NC(V) is 40% theory and 60% practical. On the one hand, NC(V) plays a positive part-where practical skills are foregrounded. On the other hand, the Nated Programme serves as a background as required by employers for entry into off campus training programmes.

According to DHET (2012), the NC(V) is meant to cover the skills gap and:

Equip learners with the knowledge, skills and values necessary for self-fulfilment and meaningful participation in society as citizens of a free country.

Provide access to further learning in the learner's choice of a specific vocational sector.

Facilitate learners' transition from formal education to the workplace.

Provide employers with a profile of learners' competencies.

Deepen the foundation laid by General Education and Training.

Lay a foundation for specialist learning.

Prepare learners for employment at an elementary level.

Develop citizens with a commitment to the social demands of our country, such as democracy, improved productivity, global competitiveness, social and economic transformation, etc.

Promote the holistic development of learners (FET Act 98/1998).

5.4 CONCLUSION

In this chapter I presented the analyses of Research Question Two. The type and nature of the existing interfaces as defined by stakeholders on the skills set for sustainable employability of TVET graduates were exhibited. The factors that impacted on teaching and learning, such as political pressure, poor infrastructure and under resourced workshops were explored. An outline of the policy differences was given, which showed that NC(V) provides vocational skills and access to further learning in a specific vocational sector and equips learners with the knowledge, skills and values necessary for self-fulfillment and meaningful participation in society as citizens of South Africa.

The next chapter will discuss the findings and present recommendations.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This research study has explored the skills sets required by a TVET graduate for sustainable employability. The role players in the three fields of mechanical, electrical and civil engineering, namely, lecturers, graduates, policy and employers were accorded a chance to give the skills that they thought were essential in their field. Chapters 4 and 5 presented the findings and analyses of the two research questions posed by the study.

This chapter will provide my concluding discussion. The existence of interfaces was confirmed by the analyses of the two research questions in chapter 5. According to all the role players involved in the study, the interfaces do exist with respect to the key requisite skills set for sustainable employability of TVET graduates.

The differences amongst the skills sets that stakeholders' identified showed a lack of connection for all the role players. This indicates a need for a reassessment of policy as well as receptiveness of employers, who are the end users of the skilled graduates. The purpose of addressing the mismatches is to define the required skills set in response to the needs of industry, as well as equipping graduates with life-long skills for self-sustenance.

In order for graduates to have the skills set for sustainable employability, they have to possess all the skills mentioned in chapter 5 and more importantly incorporate the skills that the employers highlighted as being needed by industry. In this regard, Saravanan (2009, p. 1) says,

“Employability skills are very essential in the current global job market. These skills can be termed as soft skills, which are given utmost importance in campus interview. At college level education, it will be a productive venture to incorporate these skills in the syllabus. This will certainly help students develop their employability skills and it will make them execute the assigned works efficiently in any institution after the selection process.”

6.2 RECOMMENDATIONS

After gathering and analysing data, from policy documents for both NC(V) and Nated, engineering (mechanical, electrical and civil) lecturers, graduates and employers it was shown that there are skills required by graduates for sustainable employability in all the three fields. In order to have graduates with the skills set, there has to be a close link among all the role players so that the graduates can gain skills which are responsive to the prescripts of industry.

The following recommendations should be studied by policy makers:

- The Nated policy or curriculum needs urgent revision, as highlighted in the study of role players' opinions. Nated no longer serves its intended purpose of providing skills set for sustainable employability as required by industry.
- The NC(V) policy needs to be revisited after a fixed period such as five years, so that role players can meet and refine the policy so that it achieves its intended purpose. It is important to ensure that a truly consultative process unfolds so that all role players will take responsibility for the end product.
- There is no institution in South Africa that trains pre-service TVET lecturers, which may be an important reason for the failure of lecturers to impart the required skills set for sustainable employability. In order to give a new life to the system it is recommended that a lectureship program is introduced, where lecturers are trained both in content specific areas and the appropriate pedagogics.
- To ensure that the learners entering the TVET colleges have a firm background in basic technical context knowledge and skills as proposed by the employers, I suggest having more technical schools that offer a wide spectrum of trade oriented subjects (technical subjects) in order to give a good background for post-school skills training. More so, it would help if learners are streamed from secondary school and specialise so that their background can be content rich.
- The importance of career guidance is strongly emphasised. My experience at a TVET college corresponds to the sentiments expressed by employers that students have little choice in the programme they are to study. Accordingly, career guidance in schools is of paramount importance. The schools must liaise with nearby TVET colleges and arrange learner visits to show prospective students the various career paths

well in advance of college entry. The graduates also need some career-development programmes that are aimed at preparing them for the world of work.

➤ The misalignment of skills can be curbed by ensuring strong ties and communication among role players, so that they can support each other when the need arises.

➤ From the findings it emerged that companies have no time to train graduates due to work pressure and deadlines. I recommend that companies of a certain size are encouraged, or even required, to have either a training centre to offer skills training to graduates. In addition, there must be a policy guiding skills training in companies with incentives such as tax rebates so that companies are lured into meaningful skills development.

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APPENDICES

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Appendix 1:**LETTER OF INFORMED CONSENT - RECTOR**

University of KwaZulu-
Natal
Edgewood Campus
Private Bag X03
Ashwood
3605
7 July 2015

Dear Principal/rector

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT MAJUBA TVET COLLEGE

My name is JOSEPH MESUWINI. I am a student reading for a master's degree in Technology Education at the University of KwaZulu-Natal, South Africa.

My research study is titled: **An exploration of the skills set required for sustainable employability of Technical Vocational Education and Training (TVET) engineering graduate: A Case for Majuba TVET college, Newcastle, KwaZulu-Natal.** This study seeks to explore the skills sets required by engineering graduates for sustainable employability as perceived by policy, lecturers, graduates and employers. The purpose is to explore if there is an interface between skills acquired by Engineering Graduates and the skills required by the employers for sustainable employability.

I hereby seek your permission to conduct my research at Majuba TVET College in 2015. Data will be collected from the Engineering teaching staff using a questionnaire and semi-structured interviews. The teaching staff who decide to participate in this study will be required to complete a consent form. Their participation in this study is voluntary and participant has the right to withdraw from the study at any time

Please note that:

- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.

- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
- Your involvement is purely for academic purposes only, and there are no financial benefits involved.
- If you are willing to grant me access to your school please indicate (by ticking as applicable)

	Granted	Not granted
Access		

I can be contacted at: 072 970 0678
 Email: jmesuwini@yahoo.co.uk

My supervisor is Dr. A. Singh- Pillay,
 School of Education
 Edgewood campus, University of KwaZulu-Natal
 (Tel) 0312603672 Email: pillaya5@ukzn.ac.za

My Co-supervisor is Ms van Wyk who is located at the School of Education, Science and Technology cluster, Edgewood campus of the University of KwaZulu-Natal.
 Contact details: email: Phone number: 031-26053672

You may also contact the Research Office through:
 The following personnel from the research office may be contacted:
 Ms Phumelele Ximba Tel. No. 031 60 3587 Email: HssrecHumanities@ukzn.ac.za
 Mr Premlall Mohun Tel. No. 031 260 4557 Email: HssrecHumanities@ukzn.ac.za

Thank you for your contribution to this research.

DECLARATION

I..... (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

Appendix: 2

School of Education, College of
Humanities,
University of KwaZulu-Natal,
Edgewood Campus,
7 July, 2015

Dear Participant

INFORMED CONSENT LETTER

My name is JOSEPH MESUWINI. I am a Masters candidate studying at the University of KwaZulu-Natal, Edgewood campus, South Africa. I am interested in exploring the skills set required for sustainable employability on TVET engineering graduate. To gather the information, I will be asking you some questions via a questionnaire and an individual interview. In addition, I also require permission to video record the interview.

Please note that:

- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.
- The questionnaire will take 10 minutes to answer and interview may last for about 20 minutes and may be split depending on your preference.
- Any information given by you cannot be used against you, and the collected data will be used for purposes of this research only.
- Data will be stored in secure storage and destroyed after 5 years.
- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
 - Your involvement is purely for academic purposes only, and there are no financial benefits involved.
 - If you are willing to be interviewed and have the interview video recorded please indicate (by ticking as applicable) whether or not you are willing to allow the recording by the following equipment:

	willing	Not willing
Audio equipment		

Video equipment		
-----------------	--	--

I can be contacted at: Tel. No.:

I can be contacted at: 072 970 0678

Email: jmesuwini@yahoo.co.uk

My supervisor is Dr. A. Singh-Pillay,
School of Education
Edgewood campus, University of KwaZulu-Natal
(Tel) 0312603672 Email: pillaya5@ukzn.ac.za

My Co-supervisor is Ms van Wyk who is located at the School of Education, Science and Technology cluster, Edgewood campus of the University of KwaZulu-Natal.
Contact details: Phone number: 031-26053672

You may also contact the Research Office through:

The following personnel from the research office may be contacted:

Ms Phumelele Ximba Tel. No. 031 60 3587 Email: HssrecHumanities@ukzn.ac.za

Mr Premlall Mohun Tel. No. 031 260 4557 Email: HssrecHumanities@ukzn.ac.za

Thank you for your contribution to this research.

DECLARATION

I..... (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

Appendix: 3

ANALYTICAL TOOL USED FOR ANALYSING THE POLICY DOCUMENTS

1. Context

- Sources of the policy document
- What is the historical background/origin of the document?
- What was the purpose behind its production?
- Who is responsible for its publication (the author and context that led to its production)?

2. Recommendation

- What is the rationale behind the recommendations made?
- What is the conception of the recommendations according to the policy?
- What are the explicit and implicit goals to be achieved through such recommendation?

3. SKAV

- What skills, knowledge, attitudes are targeted at to be achieved through the policy recommendation
- How are the recommendations made going to be achieved practically?
- What seems to be taken for granted by the policy document in making the recommendation?

4. Implementation

- What measures are to be taken to ensure successful implementation of the recommendations made?

Appendix: 4**QUESTIONNAIRE: ENGINEERING GRADUATES**

Graduate biographical information

Please provide the response as requested in the box below.

Biographical data

Age:	
Gender:	
Course studied	
If employed within the Industry kindly complete the following questions :	
Specify the sector	
Numbers of years employed	
Capacity in which employed	
If others, kindly complete the following questions:	
What activities are you engaged in?	
How long have you been engaged in the above activities since graduation?	
In what capacity are you involved in the above mentioned activities?	
Any other additional comments:	

1. What were your experiences like at the Majuba TVET College in terms of skills development for sustainable employment? Elaborate on highlights and low-points.

2. What kind of skills sets are required in your current employment or activities you are engaged in? Please elaborate;

3. In your opinion, what would you say about your preparation by Majuba TVET College for your current employment or activity you are engaged in? Please elaborate;

4. Any other additional comments;

Appendix: 5**QUESTIONNAIRE: EMPLOYERS IN ENGINEERING SECTOR**

Employer biographical information

Please provide the response as requested in the box below.

Name of company	
Company profile	
Name of participant	
Gender	
qualification	
Position	
Department employed	
Capacity in which employed	
Study duration of the above mentioned qualification	
Location of the company where you are employed	
Sector in which employed	
Numbers of years employed	

1. Briefly describe the nature of work that your department engages in.

2. What skills set are required to be engaged in the type work that your department is engaged in?

3. Of what significance are the above mentioned skills to the work you do in this establishment?

4. Do you in any way employ graduates from Majuba TVET college
Yes No

5. If so what skills do you look for in these graduates?

6. Any other additional comments?

Appendix: 6

QUESTIONNAIRE: TVET LECTURERS

Biographical data

Age	
Gender	
Qualification	
Where was the qualification mentioned above obtained	
Numbers of years employed	
Capacity in which employed	
Courses that you teach/taught	

1. What skill sets do you think Engineering graduates need for sustainable employability in the engineering industries?

2. Why do you think the skills mentioned above are considered to be important? Please explain.

3. In the present curriculum in use at Majuba College are there Skills or content that you consider to be important/unimportant? If so kindly list them.

4. Are there skills that you foreground in your teaching engineering and why? Kindly explain

Appendix: 7**INTERVIEW QUESTIONS: GRADUATES**

1. What skills set do you consider to be important for sustainable employability?
Please explain.
2. How these skills were developed in you?
3. Did the TVET engineering curriculum used at Majuba equip you with skill needed for sustainable employability? Please explain.
- 4.1 What factors hindered the development of skills for sustainable employability?
Please explain.
- 4.2 What factors promoted the development of skills for sustainable employability?
Please explain
5. How do you manage to keep abreast for sustainable employability?
6. Where you adequately prepared by your TVET qualification for your current job? Please explain.
7. Did you encounter any difficulties in seeking employment with your qualification from Majuba College? Please explain.

Appendix: 8**INTERVIEW: LECTURERS**

1. What skills set do you consider to be important for sustainable employability? Please explain.
2. How do you develop these skills in students?
3. Does the TVET engineering curriculum used at Majuba equip students with skill needed for sustainable employability? Please explain.
- 4.1 What factors hindered the development of skills for sustainable employability? Please explain.
- 4.2 What factors promoted the development of skills for sustainable employability? Please explain
5. How do you manage to keep abreast for sustainable employability in students?
6. Does the curriculum prepare your students for employment? Please explain.

Appendix: 9**INTERVIEW: EMPLOYERS**

1. What skills set do you consider to be important for sustainable employability? Please explain
2. How do you develop these skills in your employees?
3. Does the TVET engineering curriculum used at Majuba equip graduates with skill needed for sustainable employability? Please explain.
4. What factors hindered/promoted the development of skills for sustainable employability? Please explain

APPENDIX 10: GRADUATES INTERVIEW DATA SHEET

GRADUATES									
QUESTION	1 Mechanical	2 Mechanical	3 Mechanical	4 Electrical	5 Civil	6 Electrical	7 Civil Self- employed	8 Civil Self- employed	9 Boilermaking
1. What skills set do you consider to be important for sustainable employability? Please explain.	- Safety skills. - Machine operations and correct tool handling	Learnt the use tools and machines and application of safety rules.	- Drawing is an important skill in engineering and safety. -Basic understanding from school.	- Hand tools skills are very important. It is difficult to work without knowing hand tools. Safety rules.	- Plumbin g, building and masonry are important in civil.	- Maintain, install, design and develop starters and motors from drawings . Ability to read drawing.	- Handling skills, hand tools involved.	- Knowledge to supervise workers. -ability to calculate, plan and budget. -Safety is a requirement that every employee should have in order to work safely. The usage of tools like spirit level and fish line are the basic tools for a builder and their usage must be mastered.	-measuring, squaring, safe use of tools, welding. Know types of materials and joining methods. Different types of welding like MIG, TIG, Arc, Gas, aluminium welding and welding methods. Methods of cutting materials using different methods such as hacksaw, power saw, guillotine, oxy acetylene and more.
2. How were these skills developed in you?	- Theory was learnt first and then practical on different machine types and processes. -Practical is more important in industry so that you can be part of production process. - The theory at	-Know one self and have ability to work towards the skill. -Being well mannered and goal minded helps to have knowledge of future ahead and respect towards others which	- Lecturers in the subject and practicing helped to improve the skill.	- Trip to companies to see real work situation helped to understand the career and role once employed. - Practical s done at colleges helped to further understand the	- It was the practicals , expertise from colleagues and textbooks that helped with information.	- Doing practicals as a way of complimenting theory learnt.	- Practical s are important as you can't work without practical knowhow. -There is a huge gap between the college work and what is found in the world of work.	- Pricing is a skill that one must have as an entrepreneur and this is done on in construction supervision and construction planning.	Workshop practicals, theory in class, practicing on part time jobs while on training.

	college is same as found in industry.	helped in achieving results.		field of study (Fault finding).					
3. Did the TVET engineering curriculum used at Majuba equip you with skill needed for sustainable employability? Please explain.	<ul style="list-style-type: none"> - Practicals learnt at college at Majuba laid a good foundation which included many things such as machine operations and tool handling. - The same principles are applicable at the workshop every day in industry. 	<ul style="list-style-type: none"> - More practicals needed to understand the principles. Group practicals were more often due to time and resources. 	<ul style="list-style-type: none"> - Yes. The syllabus gives basics and measuring, scales and terminology. Bending formulae were well mastered. 	<ul style="list-style-type: none"> Yes, adequately prepared. - All that was done at college is the same found at work. 	<ul style="list-style-type: none"> - Skills obtained at college are enough for the current job but companies need to see the national diploma. - currently Building inspector in low cost houses. 	<ul style="list-style-type: none"> - Practical s were done. 	<ul style="list-style-type: none"> - There is a lot that is found at the workplace, which is not taught at college. -This shows the importance of the practical experience in industry. 	<ul style="list-style-type: none"> - Yes. Planning a job, reading and drawing a plan was learnt. All the skills applicable onsite have been learnt. There is a lot of creativity required when working as there is a difference when working in a college workshop. 	<ul style="list-style-type: none"> Yes. I got a permanent job and do my own jobs to get extra income.
4.1. What factors hindered the development of skills for sustainable employability? Please explain.	<ul style="list-style-type: none"> - Not prepared adequately on drawings. -Learnt more on site about drawings and developments. - Workshops not visited daily and time is very limited at college. 	<ul style="list-style-type: none"> -the shortage of equipment and limited time. - unqualified lecturers 	<ul style="list-style-type: none"> - Practicals are needed more at college in order to meet industry demands. - Students' strikes for NSFAS money. -Learning disturbed almost termly and term is short. 	<ul style="list-style-type: none"> -strike for NSFAS money - disturbed learning almost every term and term is short 	<ul style="list-style-type: none"> - There is nothing that disturbed skills development as practicals were done on a daily basis. 	<ul style="list-style-type: none"> -group practicals prevented hands on practice to some students. Group practicals prevented hands on practice to some students. 	<ul style="list-style-type: none"> -textbook shortage -drawing equipment 	<ul style="list-style-type: none"> - NC(V) is done in a full year and there is no problem encountered which hindered effective learning. 	
4.2. What factors promote the development of skills for sustainable employability? Please explain.	<ul style="list-style-type: none"> - Listening to instructions is an important tool in industry. -Real situations encountered 	<ul style="list-style-type: none"> - Lecturers offered skills at their best but some students did not attend or show seriousness 	<ul style="list-style-type: none"> - Listening to lecturers was an important tool to getting skills. - Getting a good mood. 	<ul style="list-style-type: none"> - All that was done at college is the same found at work. 	<ul style="list-style-type: none"> - Can perform plumbing, bricklaying and carpentry . Majored in 	<ul style="list-style-type: none"> - The theory learnt at Majuba TVET was quite beneficial as it helps when 	<ul style="list-style-type: none"> - Motivation from lecturers who put your mind in the workplace and help to understand 	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> Learning in workshop to do practicals. -learning theory in class. -doing extra part-time work help to

explain.	d daily	. - Practical skills learnt so far are adequate since there is routine work.	- setting a minimum achievable standard		plumbing at college.	doing practicals .	the concepts without having to go out to industry.		improve knowledge.
5. How do you manage to keep abreast for sustainable employability?		-Extend the training period for NC(V) to incorporate more practical skills so that students come out with as qualified artisans and ready to work	- Listening is a very important skill in order for one to learn any skills.	- Doing Nated course in order to obtain a diploma.	- Self-development through further studying. - Working extra tasks at a relative's company to gain more experience in the field. -Have done maintenance jobs around Newcastle and new projects which has helped with a lot of experience.	- Reading books as a way of refreshing content. - Practical tasks from a training centre on phase 1, 2 and 3 have helped to keep up with hands on experience required by industry. - Electrical wiring, tubing, cable joints and motor repairs are some of the areas covered.	- There is lack of tools such as the dumpy level, which is found at the work place as a first experience.	- There are standards laid down by the building associations such as NRBC. These associations require that anyone who engages in construction should have minimum requirements and must conform to the set standards.	-Working every day. -different tasks give experience and improve skills.
6. Where you adequately prepared by your TVET qualification for your current job? Please explain.	- Training at college must have more practicals than theory because at workplace it is the application of practical skills which	- Majuba offered enough basics for current job. - Extend the training period for NC(V) to incorporate more practical	- Training was enough. - It is the application of the skills learnt at college which is done at work. -There is	- Strikes play a negative role in disturbing completion of syllabi.	- The NC(V) curriculum does not have option for road construction which has posed	-Not working. Employers say my qualification is too high for a job.	- Yes. Engineering entails research because the corporate world is changing every day. -There is need to keep to	-Yes	Yes. Can attend breakdown . -can design and solve problems. -plan and cost a job. Meet targets for clients.

	counts.	skills so that students come out with as qualified artisans and ready to work	need to increase practicals at level 4 because as an exit level so that when you go to industry you will be able to apply recent skills. -Drawing should be continued at level 4 because it is a requirement at any engineering company.		challenges on getting jobs in such sectors. - Majuba has done a great job giving a chance for further training. - Some companies are still questioning what NC(V) is which shows lack of understanding on the program. -NC(V) offers skills for life and a person who goes through training will not go hungry as it gives self-sustaining skills to do jobs for a living.		time frames. -The skills learnt at college were vital and helped to have a general understanding of the civil engineering field.		
7. Did you encounter any difficulties in seeking employment with your qualification from Majuba College? Please	- Did not have problems getting a job with NC(V) level 4. - Appreciated to college for the	- Did stay home for only 6 months and got a job as an apprentice. - Thought NC(V) was a waste of time before engaging	- Finished in 2012 and got an apprenticeship in 2015. -Attended one interview since completion.	Recommend the course to others.	- NC(V) is a foundation course which needs to be supported by other qualifications as	- Getting a job is a problem as companies say that N6 is highly qualified for available jobs.	- There were problems getting work due to lack of experience. - Companies consider experience as a first	- Employment is difficult to get. Job adverts state civil diploma not NC(V) certificate. Level 5	-Did not have a problem getting a job. - had good practical skills.

explain.	academic efforts and placement opportunities created by college.	in employment until I got a job, then realised the value the skills learnt at college.	<ul style="list-style-type: none"> - Didn't see the importance of NC(V) and wanted to do Nated. - After TVET college training the company revealed that the course had significance in engineering. 		there is a lot of completion outside with diploma and degree holders.	<p>Companies not prepared to pay a salary commensurate to the qualification.</p> <ul style="list-style-type: none"> -They ask for N2 or N3 for apprenticeship training. 	<p>priority as their prime concern is production.</p> <p>"If you have no experience you are like a cabbage in the garden just waiting to be watered."</p> <p>-More practicals are needed as done on the NC(V) so that Nated can be improved.</p>	and 6 are available in the cape. The question is why it is not offered in Majuba TVET?	
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APPENDIX 11: LECTURERS INTERVIEW DATA SHEET

Lecturers						
Question	1. Mechanical	2. Electrical	3. Civil	4. Mechanical	5. Electrical	6. Civil
1. What skills set do you consider to be important for sustainable employability? Please explain.	Analytical skills, creativity, problem solving skills are important. - Problem solving skills are important because industry solves problems on a daily basis	- It is important to know the correct usage of hand and power tools. - ability to read Electrical drawings and house plans will enable one to understand wiring of circuits and houses.	- The graduates must have skills in computer (AutoCAD, Ally cad to help them read and draw plans. - Depending on the option that the student takes it is mandatory that the core subject is passed as it gives the main guide for the career path.	Safety is important Machine operations -ability to read and draw engineering drawings -use of AutoCAD.	House wiring -Automation -Problem solving -Computer skills - Communication skills	Computer skill -people management -CAD
2.How do you develop these skills in students?	-Text books help to cover the content. - Assignments, projects and homework give tasks which help in problem solving.	- The electrical trade has heavy current and light current. - Light current involves the application of basic electrical components and low power electrical control systems. - Heavy current deals with machines which consume high current. It involves the supply and distribution of electrical power like transformers and generators.	- There are syllabi and assessment guidelines which are followed when teaching the courses.	-Teach theory -Teach practical to show theory learnt. -show safety videos and machine operations.	Teach the 10 week Nated course every trimester. -	Through teaching and learning using subject & assessment guidelines and textbooks.
3.Does the TVET engineering curriculum used at Majuba	-Yes. -The prescribed books used have examples and exercises which speak about real life situations	-Yes. -The introduction of PLCs and programming of the panels was meant to introduce students	- The industry still doubts the qualification produces by TVET College	Yes. -They get jobs in construction. -Some are doing their own business. Trade is very cheap to start with a	There are no practical tasks involved, -students lack the practice of the trade. -students cannot	-There are graduates who are self-employed through this training. Practicals help reinforce

<p>equip students with skill needed for sustainable employability? Please explain.</p>	<p>happening in the engineering field. -Most examples are live.</p>	<p>to the new developments</p>	<p>today. -The courses that are offered sometimes are based on the content that available lecturers can deliver and not on the needs of the industry and the community. -The implementation of the curriculum compromises the types of graduate produced. -The ISAT practical is done for the purpose of producing marks than reinforcing understanding of the summative assessment and recapping of concepts learnt.</p>	<p>trowel, spirit level, shovel and wheel barrow and line.</p>	<p>work before getting practical exposure unlike NC(V).</p>	<p>understanding.</p>
<p>4.1 What factors hinder the development of skills for sustainable employability? Please explain.</p>	<p>-Nated course offers theory from N1-6 with no practical where each level is completed in 3 months. -language barrier bears negative effects. -The time is so short.</p>	<p>- The amount of content to cover in the books is too much compared to the time available. -A lot of time is lost through enrolments and students' strike.</p>	<p>-some students that come to TVET are school dropouts whilst the others are rejected by universities recruitment criteria. -students may not cope with the content. -Political pressure forces colleges to succumb to</p>	<p>Absenteeism of students Strikes. -late release of results -high lecturer/student ratio -under resourced workshops -unprepared students</p>	<p>Lack of practical component of the course. -course too short Late registration -late release of results -late recruitment of lecturers to take classes on time. -weak recruitment criteria which takes students with poor passes.</p>	<p>-Fundamental subjects waste time which should be used on teaching vocationals and doing practicals. -Strikes for NSFAS by students waste precious time. -Sometimes student numbers are too high to manage. -Poor infrastructure like a shade for use when doing bricklaying projects and avoid</p>

			<p>demands of recruiting undeserving students into TVET colleges.</p> <p>-Lecturers are teaching because they cannot fit into industry.</p> <p>-They do not have the required experience needed to train individuals who can compete effectively on the job market.</p> <p>-Obviously these lecturers are a liability to the system.</p> <p>-lecturers leave the field into industry for better offers.</p> <p>-None of lecturers engage on technology degrees for staff development</p>			weather.
<p>4.2 What factors promote the development of skills for sustainable employability? Please explain.</p>	<p>- NC(V) takes both theory and practical.</p> <p>- Assessments are done throughout the year which become part of the year mark.</p> <p>- It promotes skills development.</p>	<p>-Skills are obtained but they are basic.</p> <p>-More practice is needed to perfect their skill.</p>	<p>-The government fully supports learning through the provision of resources such as teaching and learning, NSFAS bursaries, infrastructure and even staff development</p>	<p>-Government bursaries</p>	<p>Issue of textbooks</p> <p>-finishing syllabi on time and giving revision to students</p> <p>-trips to industry</p>	<p>Lecturer's knowledge of students.</p> <p>-Participation of students.</p> <p>-Adequate resources</p>

5. How do you manage to keep abreast for sustainable employability in students?	-I have vast experience and relate examples to real situations of safety, maintenance.	- Liaise with industry to see what new technology is on the market. -Teaching about PLC and programming which will assist for employment.	- Up to date books help focus on the current trends on development s. - Workshops are held scarcely on the new development s. - trips to working sites where students get the feel of industry.	Visit companies -teach according to syllabi. -use reference books. Visit local sites like houses under construction.	-get updates from professional bodies on latest developments in the field.	-reinforcing on basic skills required by industry.
6. Does the curriculum prepare your students for employment? Please explain.	Yes. -The practicals offered are hands on especially on NC(V). -safety on the use of tools is learnt on both programmes.	- Yes. It has practical training though time is limited.	-Yes. -Curriculum offers practicals which give a true guide of what is done in industry. -Important concepts are done and some are simulated. -It is the size of work done at college which differs what is done in industry due to limitations on materials, time and other resources.	Each level is a yearlong which gives enough time to prepare students. -the syllabus used is confirmed by employers as stakeholders in training.	It gives relevant theory. Lacks practical necessary in industry.	It does. Most of the content covered is what construction industry does.

Appendix 12: EMPLOYER INTERVIEWS DATA SHEET

Questions	EMPLOYERS		
	1	2	3
1. What skills set do you consider to be important for sustainable employability? Please explain.	<ul style="list-style-type: none"> - A proper background of the trade is required which is N3 with a minimum pass of 50% in Maths and Science. - A trade theory subject of the related field of study is an added advantage which gives a fundamental understanding of what the trade is about. The basis must be properly laid so that they have an understanding of what career they enter into. - A lot of school leavers want to become millwrights, electricians, boiler makers and fitters but they know nothing about what the trade entails. Safety is the first important aspect taught so that they can work safely, think safely and have safety as a priority. Safety is indoctrinated into everyone. 	<ul style="list-style-type: none"> A good knowledge of engineering drawing is required. - quality work, conforming to standards. - working within given time frames. Meet delivery dates -Safety. 	<ul style="list-style-type: none"> Students bring papers but when it comes to production that person cannot cope with the work. -It is difficult to facilitate training if someone lacks skills because everyone is there for production. -A company trains people according to the needs of the company so that they can produce as required. -Some companies use those graduates for sweeping and carrying things from place to place because they cannot afford time to give proper training.
2. How do you develop these skills in your employees?	<ul style="list-style-type: none"> - Many tests such as psychometric, strength and aptitude tests are conducted in order to ensure that the correct candidates are engaged into the various trades available. - Structured log book used which ensures that the planned training is received. After every quarter in the plant a log book inspection is done where trainees complete 	<ul style="list-style-type: none"> Experience takes time to build in a person. -due to large amount of work pressure to meet demand of international clients, time to attend to trainees becomes scarce. - Every task is discussed before it is done. -Online inspection 	<ul style="list-style-type: none"> - There is need for a lot of control on the workplace training so that effective training can be induced. -

	<p>reports of what they have learnt showing understanding in each concept learnt. The managers in the different field will conduct assessments to declare them competent for the duration spent in the plant. After qualifying a candidate artisan program is offered for duration of one year where they are taught to work independently as opposed to the time of training where they worked under a mentor. More skills of independence, responsibility and additional technical training are offered during this period. It is during this period that those that excel are taken as permanent employees to fill any vacancies that arise.</p>	<p>is done to ensure quality of work produced.</p>	
<p>3. Does the TVET engineering curriculum used at Majuba equip graduates with skill needed for sustainable employability? Please explain.</p>	<p>It is not in line with what industry has evolved. - The curriculum is old. -It needs to be aligned with what industry of today wants. -It is currently entirely useless and it seems a lot of lecturers have not been in industry at all therefore understanding the concepts and being able to teach are different issues.</p>	<p>Attendance plays a role in giving an overview of the person's attitude towards work. -time sheets are used to ensure that trainees are presenting themselves as required.</p>	
<p>4. What factors hinder the development of skills for</p>	<p>- It seems those that come to college want to become electricians and when it is full then you redirect</p>	<p>- large amount of work pressure to meet demand of international</p>	<p>- The foreman and supervisors cannot train the graduates coming from colleges as their prime duty is</p>

<p>sustainable employability? Please explain.</p>	<p>them to other fields. This shows that they do not know what they really want to become.</p> <ul style="list-style-type: none"> - A handful knows what they want because if I really want to become an electrician I will not go to civil because that is where space is available. - There is need to partner and educate people in school on what career choices are available so that they know what they want to do when they come to register. --Old curriculum. -too short training periods. 	<p>clients, time to attend to trainees becomes scarce.</p> <ul style="list-style-type: none"> -Those that get a chance to train must use it carefully because the opportunities are hard to come by. -Bad attitudes. 	<p>to ensure that the plant is running smoothly.</p> <ul style="list-style-type: none"> -There are experienced people who do not have relevant papers for their trades but they know their work very well. -These people may not be willing to share what they know due to jealous and fear of their job security. - The fear is that once the person with papers is able to perform duty there will be greater chances of upward mobility. - The women are being discriminated in the engineering field because companies feel that they cannot perform.
<p>4.2 What factors promote the development of skills for sustainable employability? Please explain.</p>	<ul style="list-style-type: none"> - MERSETA has now put a project in place to train lecturers which is a positive move to up skill lecturers. 		<p>A lot of qualified and experienced labour force and wide range of good quality jobs done.</p>

APPENDIX 13: EMPLOYER BIOGRAPHICAL INFORMATION AND DATA

Name of company	1	2	3
Company profile		Engineering	
Name of participant			
Gender	M	M	M
Qualification		Boilermaker	Artisan
Position	Training Manager	Foreman	Training Manager
Department employed	Human Resources	Fabrication Shop	Training
Capacity in which employed	Training Manager	Foreman	
Study duration of the above mentioned qualification	14	3yrs	
Location of the company where you are employed	Newcastle	Newcastle	Newcastle
Sector in which employed	Manufacturing	Engineering	Engineering
Numbers of years employed	25	38	
Questions			
1. Briefly describe the nature of work that your department engages in.	<p>Management of the training and development function.</p> <p>-co-ordination of induction & sherg (Safety, Hygiene, Environment, Risk and Quality) training</p> <p>-management of the training cycle</p> <p>-implementation of apprenticeships, internships & learnerships and management of skills pipelines.</p> <p>-co-ordination of management & leadership training.</p>	<p>Fabrication of earth moving equipment.</p> <p>-Dump truck bodies</p> <p>-Buckets</p> <p>-Recondition of earth moving equipment</p> <p>-General fabrication</p>	<p>Training of welders and boilermakers.</p>

	<ul style="list-style-type: none"> -consultation with trade unions -compile and submit training reports to stakeholders. -training meetings with line management -liaise with the Merseta & training providers -conducting of training audits -development, implementation & maintenance of quality system for training. -assessment, moderation & continuous improvement. -succession planning -manage and facilitate the external training needs. -ensure development of workforce -manage external training -participate and provide evidence for external audits – teta, merseta, irca, dqs -safety retention and talent management. -development and implementation of an electronic archiving system for training -e learning. 		
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<p>2. What skills set are required to be engaged in the type work that your department is engaged in?</p>	<p>The skills include: - leadership, initiative, customer focus, negotiation and consultation, communication, writing skills, organized, co-coordinating, team leader, problem solving and time management.</p> <p>-Knowledge of relevant skills development legislation is also important.</p> <p>-The personality traits include:</p> <p>-being a self-starter, independent, friendly, well organized, quick learner, good judgment, positive attitude, creative, flexible and outcomes and goal directed.</p>	<p>Trade tested boilermakers and welders.</p> <p>-Tool handling.</p>	<p>Development s</p> <p>-platters drawing</p> <p>Welding-arc, CO₂, MIG, TIG</p> <p>-measuring.</p>
<p>3. Of what significance are the above mentioned skills to the work you do in this establishment?</p>	<p>It is important as we are a business partner to line management.</p> <p>-We need to ensure that employees are trained and fit for purpose.</p> <p>-This will ensure that the Strategic Objectives of the organisation are realized and that we can meet our customer expectations.</p>	<p>Good quality of work produced</p>	<p>Fundamental- can't do without</p>
<p>4. Do you in any way employ graduates from Majuba TVET college</p> <p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>		<p>Yes.</p>	<p>Yes.</p>

5. If so what skills do you look for in these graduates?	<p>-Candidates that have the potential to be developed.</p> <p>-Basic understanding of technical aspects related to the discipline.</p> <p>-Candidates that apply the theoretical component of their learning in a practical situation.</p>	Trade tested.	Fabrication/structural drawings N2 level.
6. Any other additional comments?			

APPENDIX 14: LECTURERS' QUESTIONNAIRE RESPONSES

Questions	Lecturers					
	Mechanical	Electrical	Civil	Mechanical	Electrical	Civil
	1	2	3	4	5	6
1. What skill sets do you think Engineering graduates need for sustainable employability in the engineering industries ?	Creativity, - analytical, - productivity Goal oriented, -ability to work under pressure.	General knowledge -basic hand and power tools -electrical symbols -Drawing knowledge	Engineering drawing -design - Mathematics Trouble shooting -brick laying -computer skills Bricklaying -plastering -roofing -Tiling. -painting	Safety - understanding machine operations -ability to read drawings -ability to use AutoCAD -comprehend engineering systems like hydraulics, pneumatics, drives, mechanisms.	House wiring Automation -installing remote controlled gates, electric garage doors Mathematics- problem solving. - communication skills -computer skills	Bricklaying -roofing -Setting out -Measuring -bills of quantities -drawing plans -Plastering
2. Why do you think the skills mentioned above are considered to be important? Please explain.	One is able to analyse a problem in many ways, -help find the best possible solution.	To better develop their skills. -to remove, install and make basic components. -perform electrical installation -repair and test equipment.	Drawings are now done on computer(AutoCAD, Ally Cad) - modification to plans	-above attributes help to understand how to work in an engineering firm.	Skills are required by industry -can be self-employed.	You cannot be a builder if you can't do the above.
3. In the present curriculum in use at Majuba College are there Skills or content that you consider to be important/unimportant? If so kindly list them.	Analytical & problem solving skills, -Maths and Engineering science.	Equips learners to adapt easily to work environments -knowledge and usage of safety, basic hand and power tools. -communication skills. -being a team	-computer under Life Orientation -Materials Plant and Equipment Masonry Measuring and reading plans- planning.	NC(V) should add engineering drawing subject from level 2-4 and remove life orientation and English. -Nated must introduce	IMPORTANT House wiring Artisan training Nated program -Electrical trade theory UNIMPOR	IMPORTANT Bricklaying -planning -Plastering -Setting out -Measuring -Reading plans -Practicals

		worker. -planning.		practicals at college to help students understand concepts.	TANT NC(V) program Mathematical literacy.	UNIMPOR TANT -Life orientation - Communication
4. Are there skills that you foreground in your teaching engineering and why? Kindly explain	Yes. - Analytical & problem solving skills. Engineering problems don't follow the same pattern. -wide range of thinking ability needed. -accuracy and critical interpretation required to find solutions.	Practical skills. Usage of hand tools -understanding parts and function of tools. -easy adaptability to work environment.	AutoCAD -Ally cad Bricklaying Plastering -reading plans -measuring -supervision.	Engineering is important to understand fitting and assembly. -machining -measuring -calculations -safety - responsibility -time conscious -target orientated.	Practical experience -incorporate theory & practical -practical examples of real life situations.	Bricklaying is basic skill -plastering is part of bricklaying -setting out is initial step when starting a building construction . -plumbing is done on all buildings -roofing is needed on every structure.