Lecturers' Reflections on the Teaching of Electrical Systems and Construction NQF L4 NCV Curriculum at TVET College Campuses in KwaZulu-Natal

School of Education, College of Humanities

University of KwaZulu-Natal. Edgewood Campus

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Curriculum Studies

By

Cornelius Hlangene Nzimande

Student No: 216075837

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DECLARATION - PLAGIARISM

I, Cornelius Hlangene Nzimande declare that:

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2. This dissertation has not been submitted for any degree or examination at any other university.

3. This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

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SUPERVISOR'S STATEMENT

This dissertation has been submitted with my approval.

Professor Simon Bheki Khoza

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Challenges of an educational journey may not be predictable but commonly find you on the way. Your success in handling these challenges is mainly influenced by the quality of people surrounding you, the positive value they add, the support and encouragement. Therefore, for this study, justice will not be done if these individuals are not acknowledged. There were instances when I could vividly see the light at the end of the tunnel but with their help and guidance, they inspired me to move on.

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DEDICATIONS

This study is dedicated to my family mainly my late parents Ntombane and Hezekial Nzimande and my mother in-law Ntombifuthi Lillian Zungu who recently departed. *"You did not have an opportunity to be part of this journey but your spirit will always be with us".*

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May the Almighty God be with you.

ABSTRACT

The purpose of this study was to explore reflections of seven lecturers, all teaching Electrical Infrastructure Construction NQF L4 NCV subjects. Moreover, three are teaching Electrical Systems and Constructions (ES&C) NQF L4 NCV curriculum elective subject and four teaching core subjects at two TVET College campuses in Kwa-Zulu Natal. The research was also meant to answer the following research questions:

- What are the lectures' reflections of the teaching of ES&C NQF L4 NCV curriculum at TVET College campuses?
- What informs lecturers' reflections of the teaching of ES&C NQF L4 curriculum at the TVET College campuses? (Why these reflections?)
- Mention study educational gains from the lecturers' reflections as they teach ES&C NQF4 NCV curriculum at the TVET College campuses.

This study presents qualitative method and framed in an interpretative paradigm. Purposive and convenience sampling were utilised to select the most accessible participants. Furthermore, this study was framed by the concepts of curricula spider-web concepts/learning signals to explore lecturers' reflection on their teaching practice.

Data was generated through reflective activity, one-on-one semi-structured interviews and focus group discussion to explore the lecturers' reflections. Data was analysed using guided analysis. Moreover, lecturers' reflections levels were categorised into professional, societal and personal rationale. However, the study findings indicated that lecturers were mostly influenced by personal and societal rationale in teaching of ES&C NQF L4 NCV curriculum.

The findings of this study also revealed that lecturers are not aware of all the factors that underpin their teaching practices. Furthermore, the lack of the knowledge of the curricular spider-web concepts/ learning signals may result in disparities between intended, implemented and attained curriculum. The findings from the literature review identified three levels of reflections that are important for lecturers to understand the curriculum. These levels are technical, practical and critical reflection, and they were used to frame the responses of the teachers.

In addition, this study finding revealed that training resources were a major challenge that created disjuncture between the intended, the implemented and the attained curriculum. Recommendations were made suggesting that lecturers be empowered with critical reflections knowledge, to be able to master curriculum implementation challenges. Moreover, the management must attend to the resources challenges.

Key words: Electrical System & Construction NQF L4 NCV curriculum, dual-content, curricular spider-web concepts, learning resources, Lecturers' reflections.

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LIST OF ACRONYMS FOR THE STUDY

Acronyms	**Description**
AATP	Accelerated Artisan Training Plan
AETIE	Applied Engineering Technology in Education
BITB	Building Industrial Training Board
CBET	Competence Based Education & Training
CBMT	Competence Based Modular Training
CCFO	Critical Cross Field outcomes
CDO	Critical Developmental Outcomes
CoC	Certificate of Compliancy
COTT	Central Organisation for Trade Testing
CQI	Continuous Quality Improvement
DBE	Department of Basic Education
DoE	Department of Education
DHET	Department of Higher Education and Training
EC&DE	Electronic Control and Digital Electronics
EIC	Electrical Infrastructure and Construction
EPP	Electrical Principles and Practice
ES&C	Electrical Systems and Construction
ESASS	External Summative Assessment
ETQA	Education and Training Quality Authority

EU	European Union
EW	Electrical Workmanship
FET	Further Education and Training
HRDCSA	Human Resource Development Council for South Africa
HW	Hard-ware
ICASS	Internal Continuous Assessment
IW	Ideological ware
ILO	Industrial Labour Organisation
IPAP	Industrial Policy Action Plan
ISAT	Integrated Summative Assessment
ITB	Industrial Training Board
LSEN	Learners with Special Educational Needs
MITB	Metal Industries Training Board
MTSF	Medium Term Strategic Framework
NBI	National Business Initiative
NCV	National Certificate: Vocational
NDP	National Development Plan
NSFAS	National Students Financial Aid Scheme
NPC	National Planning Commission
NQF	National Qualification Framework
OBE	Outcome Based Education
OBTL	Outcome Based Teaching and Learning
PPC	Production Performance Competence
PSET	Post School Education and Training
QCTO	Quality Council for Occupations and Trades
SASSA	South African Social Security Agency
SETA	Sector Education and Training
SIP	Strategic Infrastructure Project
SOE	State Owned Enterprise
SW	Soft-ware
TPC	Training Performance Competence
UNESCO	United Nations Education Scientific and Cultural Organisation
WIL	Work Integration Learning
WBL	Work Based Learning
CATHSETA	Culture, Arts, Tourism, Hospitality and Sports SETA
IGTR	Indor-German Tool Room

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CHAPTER ONE

The overview, context, and objectives

The candidate profile and statement

The knowledge and experience I have acquired in different activities within the Technical Vocational Education and Training (TVET) Sector over the past twenty years have inspired me to embark on this research project to contribute to the body of knowledge on the subject. As part of my journey, I have served as a Regional Committee member for both Construction Seta (CETA) and the Manufacturing, Engineering and Related Services Sectoral Education and Training Authority (MERSETA). As part of the learning curve, the following projects were part of my TVET Sector activities: The KwaZulu-Natal Construction Trade Test Centre (KZNCTTC). This Trade Test Centre was modelled from INDLELA and Bellair Trade Test Centres. The KZNCTTC is fully accredited by the Quality Council for Trades and Occupations (QCTO) moreover, the training Instructors are registered by the National Artisan Moderation Body (NAMB). The second project is the Tooling Centre of Excellence modelled from the Indor- German Tool Room (IGTR) which is located at Aurangabad in India. MERSETA was responsible for the accreditation and quality assurance of the programmes. The third project is the Soccer Academy Centre of Excellence which by then was accredited by the Culture Arts, Tourism, Hospitality and Sports SETA (CATHSETA). Lastly, I was a team member in the development of the Boat-Building, a QCTO qualification under the guidance of MERSETA. All these projects are occupational qualifications.

Furthermore, I was involved in the technical colleges merger processes leading to the formation of the Further Education and Training (FET) cluster with different campuses thereafter. My international exposure involves visiting India (IGTR) as part of the KZN delegation representing KZN DOE on a tooling initiative fact finding mission in (2006) which subsequently led to the establishment of the Tooling Centre of Excellent (TCoE). The TCoE is responsible for training of learnerships and the Accelerated Artisan Training Plan (AATP). Additionally, I attended the International Vocational Education and Training Conference located in Dar—es Salaam hosted by the Tanzanian Government in 2001. The above exposures and experiences has triggered my passion to contribute to finding solutions associated with curriculum constraints and students' employment opportunities. This exposure further

challenged my societal dimension as a citizen and provoked me to want to a make difference during my life time. In order to prepare myself for this journey, I studied Electrical Engineering Diploma and further, studied Higher Diploma in Education. Thereafter, I studied a B-Tech Degree in Business Administration. Moreover, I undertook MED curriculum studies to empower myself professionally. The TVET Sector requires more studies conducted in the field of Engineering. Therefore, to contribute to the increase of the body of knowledge I have undertaken to study PhD (curriculum studies). This will offer me an opportunity to explore students' employment barriers to the world of work and the articulation to Higher Learning Institutions for further development.

1.1 Introduction

Various scholars concur that Career and Technical Education (CTE) known as Technical Vocational Education and Training (TVET) is a significant support system required by any nation to support the economic growth strategy through providing human resources with relevant knowledge, skills, values/attitudes and competences (Adam, Dawar, & Kamar, 2015; Akoojee., 2016; Ayonmike, Okwelle, & Okeke, 2015 ; Ezeani & Urama, 2014 ; Majumdar, 2013; Rasool. & Mahembe, 2014). In support of the above, Nattrass (2011); National Planning Commission (2012) and dti (2014) collectively articulate the neccessity for the TVET college sector to commit meaningfully to the national social and economic goals for inclusive growth. Similarly to this, Akoojee (2016, p. 7) asserts that education is key to effective development strategies and therefore, "technical and vocational education and training (TVET) should be regarded as the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development."

As a response to the thinking of scholars mentioned above, TVET Colleges should provide responsive and flexible curriculum which will respond to continuous structural changing environment that is capable to mirror industrial and students' personal development needs.

Furthermore, the curriculum is expected to answer to the social, fiscal and political neccessities of a developing country as positioned by the then DoE Minister Pandor (2006) and SAQA Qualification ID50441 (2006). Additionally, TVET Colleges in South Africa are mandated to develop middle-level skills and equip students with knowledge to articulate to higher institutions of learning, and for access to the work place (knowledge economy). The knowledge economy, is the education and training model that supports changes to the work organisation and skills flexibility (Angelis & Marock, 2001). However, it is essential to understand how

lecturers deal with curriculum challenges, namely the lack of alignment between official/planned and documented curricula; the implemented enacted/practiced curricula, and lastly the assessed curricula. Therefore, lecturers are expected to reflect on how they deal with the alignment of three curricula layers as they teach the Electrical Systems and Construction (ES&C) NQF L4 National Certificate Vocational (NCV) curriculum at a TVET College campus**.**

1.2 Title

Lecturers' Reflections of the Teaching of Electrical Systems and Construction NQF L4 National Certificate: Vocational competence Curriculum at TVET Colleges in KwaZulu-Natal.

1.3 Study justification

The intention of the research project is to investigate lecturers' reflections on their teaching of Electrical Systems and Constructions (ES&C) NQF L4 NCV competence curriculum at TVET Colleges in Kwa-Zulu Natal (KZN)

1.4 Location of study

The study was conducted at two TVET College campuses that are offering ES&C NQF L4 NCV curriculum. One multi-racial campus is located in an affluent urban area at Umgungundlovu District and the second campus is located in a rural area at Ugu District. The two campuses are situated two hundred and thirty kilometres apart. The multi-racial campus situated within an urban area provided five participants and the rural area campus provided two participants for this study, which is focused on lecturers' reflections on the teaching of ES&C NQF L4 NCV curriculum.

1.5 Rationale of the study

I have spent more than twenty years as a lecturer at a vocational institution having started as a workshop Training Instructor in the electrical field and moved to management of the then FET College. During this period, I observed the amalgamation of technical colleges that transformed into a multi-campus FET College. In addition, I witnessed the introduction of the National Certificate (Vocational), outcome-based driven curriculum (2007) being introduced nationally in all FET Colleges. In addition to this, I also observed lecturers having difficulties in creating a link between the official/documented and practiced curriculum which has resulted in a low

throughput rate. I also witnessed the introduction of Renewable Energy in the ES&C NQF L4 content without the provision of necessary support system to the lecturers. Further to this, I also observed lecturers being sent to workshops for continuous professional development in order to cope with NCV programs especially, ES&C NQF L4. Moreover, I observed that those lecturers who shared their workshop experiences through reflections performed better in the subjects they taught.

In the same line of thinking as the above, low throughput and poor quality training are a concern to society and the Government (DHET, 2012; Gewer, 2010; National Planning Commission, 2012). I observed poor quality training caused by the lack of relevant resources which inevitably contributed to reduced employment opportunities and essentially defeats the objectives and reasons students prefer TVET Colleges. Therefore, my institutional memory at TVET College convinces me that a study on the lecturers' reflections of the teaching of ES&C NQF L4 NCV curriculum is essential to circumventing curriculum challenges. Moreover, reflections may address the curricula problems and bring alignment between planned curricula, the implemented/enacted, and the attained curriculum.

For TVET Colleges, in South Africa curriculum change is influenced by the countrie's transformational, and broader goals agenda dynamics, which are social, political, and economical (Angelis & Marock, 2001). However, the three curriculum levels are driven by either competence or performance approaches (Bernstein, 1999) at Micro-level. In addition, TVET Colleges use Competence Based Education and Training (CBET) model, supported by Outcome Based Education (OBE) approach. The shift from instructional approach used in the delivery of Report 191 (performance model) to NCV curriculum (competence and students driven model) in 2007 resulted to many challenges facing the lecturers. For an example, the lack of dissemination of the new programmes by the Department of Education (DoE) affected the lecturers' readiness. Moreover, there was no support system provided to enhance the understanding of the Outcome Based Education (OBE) approach. Lecturers approached the NCV curriculum teaching the same as Report 191 (instructional) resulting to high drop-out rate in 2007 final examination.

Therefore, this research project seeks to investigate lecturers' reflections in the teaching of ES&C NQF L4 and hopes that the introduction of the ten curricular spider-web concepts as a framework assists them to refine curriculum knowledge, and thus boost their teaching skills.

In addition, this study, seeks to explore lecturers' reflections as they teach ES&C NQF L4. Therefore, the next paragraph focuses on reflection.

According to Rogers (2001, p. 50), reflection can be defined as a process that allows learners (students) to "integrate the understanding gained into ones experience in order to enable better choices or actions in the future as well as enhance ones overall effectiveness." Similarly Dewey (1933) identified key components of reflection as persistence, being considerate of any belief, supporting knowledge, and furthermore, the consideration of the outcome this may lead to.

Loughran. (1996) asserts that reflections provides an individual with an opportunity to learn and self-reflect especially when guided by purposeful inquiry. Furthermore, posits that it provides an individual with an insight and problem solving tools to face the world challenges. In addition, Maxwell (2013); Taylor (2004); and van Manen (1977a) contend that reflection is divided into professional/scientific/scholarly; communicative/societal, and personal/pragmatic levels. Therefore, it is imperative for lecturers to reflect at all three levels as they engage the intended, official, and documented curriculum for the smooth excecution/enactment of the practiced curriculum for the attainment of the assessed curriculum. Understanding the rationale for the enactment/implementation of the educational programme is essential (Khoza, 2015b). However, in the same line of thinking, Bantwini (2010) asserts that there must be relevant competence to put the practiced curriculum in action. Lecturers' reflection may assist at creating the synergy between the three levels of curriculum which is currently the major challenge. The above conditions have inspired me to conduct this research project to investigate lecturers' reflections of teaching ES&C NQF L4 NCV curriculum at the two TVET College campuses in Kwa-Zulu Natal.

1.6 Beneficiaries

The outcomes of the study seek to assist the TVET College community with understanding the importance of lecturer' reflections as a teaching tool. There is hope that lecturers involved in the teaching of ES&C NQF L4 curriculum (Micro-level) will become critical, and undertake continuous self-reflection as they pursue their educational practice resulting to improved students' performance. Moreover, the dual-content (integrated theory and practical) is expected to produce practical capable students leading to the enhancement of employment opportunities thus reduce un-employment, crime, in-equality and equity (Tikley, 2013).

Furthermore, this may assist in the achievement of broader goals of a developmental state, South Africa. In addition, the research project outcomes may assist the College Management at Micro-level to build a reflective and critical thinking lecturers and subsiquently give direction and insight to curriculum developers and policy makers as they review their plans and policies.

1.7 Literature Review (Scholarly narratives appraisal)

TVET education worldwide is about knowledge, skills, and values transfer to students. This implies that the curriculum is a dual-content comprised of theory and practical components. However, studies have revealed that there is an over-theorising at the expense of practical experience leading to students being practically incapable (Adam et al., 2015; Dasmani., 2011; HRDCSA TTT Report, 2014; MTT Final Report, 2013).

Furthermore, failure to comprehend the curriculum vision and goals (namely aims, objectives, and the outcomes) has been identified as key ingredients for the poor learning and teaching affecting local and international communities. Therefore, this tendency requires critical attention in order to create an acceptable and conducive educational environment (Khoza, 2015c). By the same token, Carl. (2002) identified the need for dissemination to prepare implementers as an important element but this did not take place when the NCV curriculum was implemented. Similarly, Hartley et al. (2008a) argue that there was also a lack of awareness about the OBE underpinning principles and objectives when the NCV programmes were implemented. With regard to the ES&C NQF L4 NCV curriculum, studies reveal that lecturers were having difficulties in interpreting the curriculum as positioned by the NCV Policy 2006. Therefore, the implementation/enactment processes were placed at high risk, thus resulting in undesirable outcomes (Department of Higher Education & Training, 2013; Rasool. & Mahembe, 2014). In addition, Hoadley. and Jansen (2013, p. 96) added that, "Lecturers inevitably interpret the curriculum according to their knowledge, experiences, individual preferences, talent, personal politics, and ideology." Precise interpretation is important when you teach a dual-content subject which involves practical in order to enhance students' productivity and industrial culture.

Furthermore, teaching /learning and training resources can be a hindrance to the effective advancement of students' competences and the required standards for employability (Dasmani., 2011; MTT Final Report, 2013; Serumu, 2015; Wedekind, 2016b). Therefore, knowledge of curriculum is important for successful implementation and results. This chapter

presents the ten curricular spider-web/learning signals as a conceptual framework for this research project based on scholars Khoza (2015c) and Van den Akker et al. (2009). These concepts are: Rationale; Accessibility; Goals/targets; Content; Lecturer roles; Learning space; Learning resources; Learning activities; Time; Evaluation/Assessment. Furthermore, a flow diagram presenting areas of focus is discussed in details in Chapter Two. However, a problem statement is important to give the focus of the study.

Problem statement

TVET College lecturers do not reflect on their teaching practice. This tendency results at lecturers depriving themselves opportunities to self- introspection and discovery of their weaknesses and strengths in delivering the Electrical Systems and Construction (ES&C) NQF L4 dual-content curriculum. For this subject, theory and practical are examined separately to measure the success of the students. Furthermore, lecturers had difficulties to link the documented; the enacted and the achieved curricular which led to poor student's performance, low throughput and poor quality training (DHET,2012; Gewer, 2010; National Planning Commission 2012). Moreover, there is no Practical Framework to guide lecturers, consequently leading to poor training thus impacting on students being not employable after completing the program (Buthezi, 2018; Dasmani, 2011; HRDC-SA Report, 2014; Wedekind, 2016)

1.8

The purpose of the study is to establish the following objectives:

- Explore the reflections of the lectures who are teaching theory and practical in the Electrical Systems and Construction (ES&C) NQFL4 NCV programme at TVET College campuses in KZN

- Understand reasons that inform the lecturers' reflections of the teaching of Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN

- Clarify the educational gains from the lecturers' reflections of their teaching of the Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN

1.9

The above objectives will be achieved through answering the following key questions:

- What are the lectures' reflections of the teaching of ES&C NQF4 NCV curriculum at TVET College campuses?
- What informs lecturers' reflections on the teaching of ES&C NQF4 NCV curriculum at the TVET College campuses? (Why these reflections?)
- What lessons can be learned from the lecturers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses?

1.10 Research Design and Methodology

1.10.1 Research Paradigm

This research project is framed by an interpretative paradigm (archetype). According to Guba and Lincoln (1994), the paradigm/archetype may be interpreted as the way of looking at things based on perspectives, assumptions, and world views which steer the researcher. Similarily, Collins and Hussey (2009) indicate that the study archetype (paradigm) is a cogitation of doctrines or beliefs about the nature of the world including the phenomenon being investigated and how we can know and comprehend it better. In addition, interpretative archetypes depict a world in which authenticity is socially constructed, complicated, and dynamic (Thomas, 2003). Thanh and Thanh (2015) contend that the intepretivists investigators pursue techniques that empowers them to extensively comprehend the relationship of mankind to their habitat and the roles those people play in making the social fabric a collective.

It needs to be noted that the interpretative paradigm has no transformational agenda but seeks to support human knowledge generation which may ultimately empower those entrusted with power to make interventional changes based on informed decisions. In addition, this research project is conducted to comprehend the lecturers' perspectives about their environment at Micro-level, as well as their curriculum related challenges and therefore, the intentions of this research project is to investigate lecturers' reflection on their teaching of ES&C NQF L4 NCV curriculum at their natural setting. It is assumed that the end results of the research project may pave the way for further research on the TVET College system which may assist to improve

curriculum delivery, students' results attained and also help TVET Colleges to realise the reason for their existence in the education and training framework, mandate and broader goals.

1.10.2 Research approach

Literature reveals that qualitative research intends to comprehend and clarify human and social behaviour as it is lived by participants in a particular social setting (Ary, Jacobs, Sorensen, & Razavieh, 2006; Denzin & Lincoln, 2000; Martens, 2010). Therefore, this research project adopted qualitative approach to empower the inquirer (researcher) to comprehend and explain the ways in which individuals make subjective sense of their lives. The design of research questions seeks to comprehend the participants' know-how with central phenomenon (Creswell, 2012b; Maree, 2010), which is the lecturer's reflections of the teaching of ES&C NQF L4 NCV competence curriculum at TVET College campus.

Cohen, Manion, and Morrison (2000a) affirm that qualitative approach research findings cannot be generalised but may be transferable to similar contexts. Therefore for this study, lecturers chosen (participants) are all from Electrical Infrastructure Construction (EIC) NQF L2-4 NCV curriculum teaching core electrical subjects including ES&C NQF L4. The seven (7) selected lecturers reflected on ten (10) learning signals based on curricular spider-web (Khoza, 2015c; Van den Akker et al., 2009) in their teaching of ES&C NQF L4 and other IEC subjects. Therefore, the research findings are transferable to all seven participants as well as other lecturers exposed to similar environment and context namely lecturers teaching ES&C NQF L4 at other campuses with similar context though not chosen for this project. However, it must be mentioned that no study has been conducted on Lecturers' reflections of the teaching of ES&C NQF L4 NCV curriculum at a TVET College in the field of Electrical Engineering using qualitative approach and framed in the interpretative paradigm before. Therefore, the outcome of this research project will bring new insight and contribute at finding solutions to create synergy between intended/documented curriculum (Macro-level); the enacted/practiced curriculum (Micro) and the assessed curriculum (Nano-leve). Choosing participants is key to the success of the research projects therefore, sampling cannot be excluded.

1.10.3 Sampling

Scholars have different viewpoints regarding the description of the sampling but Lantham (2007) describes sampling as a sub-group of the population. Similarly, Kerlinger (1964) and Maree (2007) posit that sampling is done purposefully, particularly to create a representative

and manageable number of participants for research. However, within the broader population, sampling (quantitative) may be financially costly and time consuming.

Scholars are agreeable that in purposive sampling the investigator is privileged to choose participants based on their availability and relevance thus minimising from the broader community. For this research project, I used purposive sampling to include participants who matched the lecturer profile document which I had given to the Campus Manager. Moreover, for this study, participants were selected from two TVET College campuses. Campus A is multi-racial located in an affluent environment at the Umgungundlovu District and provided five as lecturers for the study. Campus B is located at a semi-rural environment at Ugu District and is purely composed of African students and lecturers. This campus provided two experienced lecturers teaching ES&C NQF L4 NCV competence curriculum for the study.

1.10.4 Data generation

This study employed three methods to generate data and these are reflective activity; face-to-face interviews and lastly the round table discussions.

1.10.5 Open-ended questionnaire (Reflective activity)

Cohen., Manion, and Morrison (2011) and Valli (2009) agree that the Lecturer Reflection Activity is described as a written exercise that questions lecturers (teachers) to complete a short array of questions about the phenomenon being investigated. Furthermore, characteristics of the qualitative research reveals that participants are likely to describe a phenomenon (lecturers' reflections of the teaching of ES&C NQF L4 NCV competence curriculum) with words rather than with numbers (Bogdan & Biklen, 1992; Ivankova, Creswell, & Plano Clarke, 2007; Kumar, 2005; Leedy & Ormrod, 2010) Therefore, for this study, I chose the open-ended questionnaire (reflective activity) as the first method to offer participants an opportunity to reflect through responding to the ten curriculum spider-web concepts/ learning curricular signals as positioned by Khoza (2015c) and Berkvens., Van den Akker, and Brugman (2014) . I then collected the questionnaires three days before my meeting with participants so that I had an opportunity to plan before the Phase Two meeting.

1.10.6 Face-to-face Semi-structured interviews

Studies encourage use of multi-inquiry methods to enhance quality and depth of data generated and therefore, for this research project, face-to-face semi-structured interviews were adopted

for data generation using the same questioning tool used in the reflective activity. Moreover, face-to-face semi-structured interviews allows for questioning and illumination of answers and usually demands participants answer pre-determined questions (Bridges, Gray, & Box, 2008; Holloway & Wheeler, 2010; Maree, 2007). On the same token, Kvale (1983), contends that the motive of interviews for the qualitative approach is to obtain descriptive information of the phenomenon as seen by the interviewed participants from live experience perspective and moreover, their perception of the meaning of the described phenomenon. For this study, the phenomenon is the reflections of the lecturers of the teaching of ES&C NQF L4 NCV competence curriculum at TVET College campus in KZN. Similarly, scholars (Bertram & Christiansen, 2014; Cohen. et al., 2011; Harrell & Bradley, 2009; McMillan & Schumacher, 2010) are agreeable that semi-structured interviews are a structured conversation where the researcher has certain expectations of answers they want from the participants as dictated by a predetermined set specific questions.

Contrary to the reflective activity, I found face-to-face semi-structured interviews (one-on-one semi-structured interviews) being relevant for this research project as it permited participants to offer more comprehensive answers. Interviews were conducted for thirty-minutes (30) to fifty-minutes (50) per session which demonstrated time consuming and pricey (Opdenakker, 2006; Rabionet, 2011). I overcame this by choosing TVET College campus that specialised in Electrical Infrastructure Construction (EIC) focusing on ES&C NQF L4 NCV competence curriculum. I used my cellular phone to record the participants. The recorded information helped me to quote participants verbatim. Aside from the above, face-on-face semi-structured interviews helped in closing the knowledge gap created when reflective tool was used (Cohen, Manion, & Morrison, 2007). Realising that participants had reached saturation point, I then arranged the focus group discussion to ensure all participants were on the same page.

1.10.7 Round table group discussions

Scholars Powell, Single, and Lloyd (1996, p. 499), agree that round table group discussion is the nomination of the body of individuals with shared vision to explore and make pronouncement guided by their personal experience on the subject to be researched. (Lecturers' reflections in the teaching of ES&C NQF L4 NCV competence curriculum at TVET College campus). Therefore, for this study, I assembled participants at their respective campuses considering that campuses were a distance of 230km apart. Moreover, participant's meetings were held at difference times to avoid removing lecturers from their working space. Time spent

in group discussions was one-hour sessions repeated twice per group. Moreover, I used the same tool used in both reflective activity and face-to-face semi-structured interviews.

In addition to the above, I carefully facilitated the discussions, allowing participants to apply their minds as they responded to curricular questions while reflecting on the teaching of ES&C NQF L4 NCV competence curriculum. Moreover, I channelled questions to all participants to avoid domination from vocal participants and this helped to get the voice of the majority in order for the study outcomes to represent the group views. My observation is that the round table group discussions (focus group discussion) offered participants a chance for an instant feedback or illumination on one's view point with contributions from the fellow participants. In addition, I recorded the discussions on my cellular phone in order to quote participants verbatimin order to enhance the trustworthiness of the study and ease the quality of my data analysis process.

1.11 Data analysis

Cohen. et al. (2011) define qualitative data analysis as creating sense of data based on the perception of the partakers and their definition of their circumstances; observing paterns, categories, themes and regularities. However, this studys' raw data were sourced from participants/partakers in their responses to reflective activity; face-to-face semi-structured interviews, and the round table group discussions. However, research tools used to generate raw data are based on ten curricula spider-web concepts/learning signals (Khoza, 2015c; Van den Akker et al., 2009). However, questions to position the concepts were used which in turn provided guidance and the opportunity to analyse the data using deductive and inductive approaches. Furthermore, the raw data were cleaned and labelled then matched against the original source, the curricular concepts (themes) for identification purposes. For this study, the curricular learning signals provided theory which underpins deductive coding of the data. However, I advanced the inductive reasoning by ascertaining that categories surfaced from the data. Thereafter, I matched the categories to the data for the purposes of deductive reasoning. I used open coding which Cohen et. al (2011) define as the new label that a researcher attaches to the piece of text to describe and categorise the piece of text. In addition, I used guided analysis to code participants' responses from the recorded source, (the cellular phone) highlighting the focus of the study which is the exploration of the lecturers' reflections of the teaching of the ES&C NQF L4 NCV competence curriculum at a TVET College campus in

KZN. In addition to the above, it is important to sort out ethical issues with all stakeholders (gate keepers) to be involved in the research before approaching the participants.

1.12 Ethical considerations

There seems to be a consensus among scholars that research ethics can be viewed as the moral code guided by moral principles and sensivities to the rights of others (Allmark, 2002; Babbie, 1990; Christiansen, Bertram, & Land, 2010; Cohen et al., 2000a; Creswell, 2009; Hopf, 2004b; Murphy & Dingwall, 2001; Ponterotto & Grieger, 2008; Trimble & Fisher, 2006a). Ethics in research is important as it may involve both humans and animals. In addition institutions through ethical committees, institutions make it compulsory that the rights of partakers be safeguarded from any maltreatment that may occur. Moreover, ethical committees are responsible for ensuring that ethical standards are adhered to whilist also taking care to audit research architecture and technique prior to being utilised by participants.

Additionally, a consent letter must be issued to participants, emphasising that they are partaking on this study willingly (Allmark, 2002).

For this study, the TVET College which is the place where the phenomena are explored, became a priority. According to the TVET College communication protocol, the Deputy Principal (Academic Services) was my first point of contact to consult in order to obtain authorisation to conduct the study. Once the go-ahead was approved, the Deputy Principal linked me with the College Campus Manager who is the immediate supervisor of the participants to be researched. The Campus Manager helped me in identifying the most relevant sample for this study as I did not know individual participant's background. Moreover, receiving the TVET College permit granted me the opportunity to apply for Ethical Clearance from the UKZN Human Social Sciences Research Committee (UHSSRC) before meeting the participants. Once the ethical clearance letter was issued by the UHSSRC, I consulted the TVET College Campus Manager for a meeting with the participants in order to discuss ethical matters that may affect them (participants) and the data generation plan.

Before interviews commenced, letters of consent were issued to the participants and they were thereafter briefed on the research intention, which is to investigate the lecturers' contemplation on their practice of the enactment/implementation ES&C NQF L4 NCV curriculum. Furthermore, participants were informed in writing and verbally of their rights to confidentiality, anonymity and status as willingly participants. Additionally, participants were

told that they were at liberty to discontinue with interviews at any moment if they felt emotional distress. Moreover, to ensure their rights to privacy, fake names were to be used instead of their real names and college names. Participants confirmed their understanding of the discussions and committed to be part of the research project by signing the consent form.

1.13 Trustworthiness

Trustworthiness in a qualitative inquiry that represents the quality component of the research findings in order to justify and convince readers that these discoveries are worth paying attention to (Lincoln & Guba, 1985). Moreover, Healy and Perry (2000) argue that the superiority of a research project in each paradigm should be judged by the terminology used. In qualitative paradigms credibility, conformity, dependability and transferability are critical criteria for quality research (Berg & Welander Hansson, 2000; Guba, 1981; Guba & Lincoln, 1994; Guba & Lincoln, 2004; Lincoln & Guba, 1985; Patton, 1987). Therefore, given that this study adopted interpretative paradigm, the next paragraphs present a detailed discussions of the terms mentioned above.

1.13. 1 Credibility

Scholars concur that credibility ensures that findings reflect the authenticity and lived know-how of the participants and that the true value of knowledge is developed from the innovation of human contemplations based on the phenomena being researched (Guba & Lincoln, 1994; Kerlinger, 1964; Polit & Hungler, 1999). In ensuring the credibility of this study, I used triangulation method. According to Cohen. et al. (2011), triangulation implies collecting data from a number of different resources. Therefore, for this study, three data generation methods were used, namely: reflective activity, face-to-face semi-structured interviews and group discussion. Furthermore, the digital recording of data provided the integrity of this research project.

1.13.2 Transferability

According to Christiansen et al. (2010) transferability can be described as applicability of the research outcomes to another context. For this research project, a voice recorder was used during interviews and participants were quoted verbatim to ensure that data were accurate. Therefore, the results from this research project cannot be generalised, but can be transferable to other groups teaching ES&C NQF L4 curriculum provided that conditions and environments are similar. However, trustworthiness of the study cannot exclude dependability.

1.13.3 Dependability

According to Shenton (2004, p. 71), "dependability is the extent to which a piece of work can obtain comparable results if the work was repeated in the same settings with the matching methods". Therefore, to achieve dependability for this study, more time was spent verifying raw data, process notes, and data reduction. Moreover, precise evidence of the data generated was provided by including the direct quotations from the participants to permit readers to assess the results. However, trustworthiness requires the confirmation of data by participants.

1.13.4 Confirmability

Confirmability is concerned whether the outcomes display the experiences, and opinions of the participants and furthermore, provides assurance that the investigator has no influence to the findings (Shenton, 2004). For this study, I recognised that I did not use my authority to control the results to ensure coherence and uniformity. Moreover, participants were consulted to verify if the content of the themes captured during interviews represents their views. Over and above, I conceded biasness and possible conditions that might have affected the data in any way and have ensured that I did not use my authority as an investigator to influence the findings. The research execution plans are sometimes disturbed by unforeseen circumstances. Therefore, the next paragraph presents research limitations.

1.14 Research limitations

TVET College strikes and the ISAT preparation schedule, negatively impacted on time, thus affecting the research project. Moreover, the number of specialists' lecturers employed to teach ES&C NQF L4 curriculum per TVET College campus is limited. In addition, the access to participants, caused by tight academic teaching programme schedules with little spare time in between sessions, was an obstacle to data generation quality time. Over and above, the results from this research project are prejudiced, individual and circumstantial due to its small scale. Therefore, findings from this study can be utilised for transferability rather than generalisation.

1.15.1 Chapter One: Overview, context and objectives

Chapter One presents the synopsis, background, and intentions of the investigation. This chapter also outlines the title, the focus, research objectives, research questions, as well as the locality of the study. Chapter One indicates the motivation of the study; outlines own reasons for undertaking the study; explains what the literature says about the study phenomenon

(lecturers' reflections) and study focus (teaching of ES&C NQF L4); the worthiness of the study. This chapter also looks at a brief literature review where the of curriculum spider-web/learning signals concepts are outlined (Khoza, 2015c; Van den Akker et al., 2009). Chapter One also highlights the study architectural plan and technique, Data generation, Data analysis, Ethical issues, trustworthiness and study limitation.

1.15.2. Chapter Two: Literature Review

Literature review explores the impact of academic work (body of knowledge) produced by National and International scholars on issues related to this study. This chapter provides the reader with the reviewed literature on eight areas related to the study. These areas are: Lecturer's reflections; Curriculum presentation (intended curriculum, implemented curriculum and achieved curriculum); Curriculum dissemination; Curriculum models and their comparison; Socio-economic imperatives impact on the TVET College programmes (NCV) curriculum; Outcome-based Education (OBE) an approach for TVET College; Competence-based Modular Training (CBMT) (a proposition solution for structured practical training challenge) and the Dominant ideologies affecting TVET College curriculum.

1.15.3 Chapter Three: Curriculum Conceptual Framework

- Curriculum conceptual framework

Chapter Three focuses on ten curricula spider-web concepts/learning signals that frame the literature. This area is also covered in the literature review flow chart. Curricular concepts relevance to this study are explained. Furthermore, the importance of the cohesion between the concepts surrounding the rationale is explained. The ten curricular concepts are: Rationale; accessibility; goals; content; learning resources; lecturer's roles; learning activities; learning location; time and assessment.

1.15.4 Chapter Four: Research Design and Methodology

Chapter Four provides specifics on method approved by the research project to accomplish study intentions. This chapter reveals the embraced study design style namely: interpretative archetype.

Chapter Four also explains the sampling (convenience and purposive sampling), the profiling of the participants chosen for the research project. Moreover, this chapter outlines the data

generation methods namely the Reflective activity; Face-to-face semi-structured interviews and Round table/group discussions followed by data analysis. Furthermore, ethical considerations for the study are explained, followed by trustworthiness covering research quality concepts namely: credibility, dependability, transferability and confirmability. Lastly the chapter describes the limitations of this study.

1.15.5 Chapter Five: Data Discussions and Findings

Chapter Five introduces data analyses. Furthermore, it discusses the verdicts from lecturer's deliberations. Data presentation is based on the spider web curricular concepts/learning signals. Chapter Four shows how guided analyses are used in conjunction with the curricular spider-web concepts as themes to categorise lecturer's reflections based on instrumental, communicative and personal levels. To preserve the voice of the participants from disappearing, a voice recording system to record discussions was used.

1.15.6 Chapter Six: Summary and Recommendations

This episode presents summary of the entire research project through checking if there is orientation amongst the verdict of the research and the objectives to ascertain that study questions are addressed. For this research project, lecturers were requested to reflect on the teaching of ES&C NQF L4 NCV curriculum. Furthermore, this episode presents the conclusions of the research project, by checking if the study aims are achieved. Moreover, recommendations and suggestions for additional investigation are made.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Hart (1998) postulates that the literature review is the application of facts to support the specific technique applied to the theme, selection of the techniques/schemes and the validation that the study will add new information to the exising body of knowledge. Furthermore scholarly knowledge appraisal (literature review) is done to avoid replication of previous studies and creates an opportunity for the study to define the frontiers of the field" (Ary et al., 2006, p. 62).

This chapter presents a literature review in line with phenomenon lecturers' reflections socio-economic imperatives impacting on curriculum, curriculum levels, and presentations, documented, dissemination, practiced/enacted, and achieved curriculum. Furthermore, the study explores Outcome Based Education (OBE) and lecturers readiness to enact horizontal and students-centred competence curriculum, Competence Based Modular Training (CBMT), TVET College role in developmental state, educational ideologies in curriculum, comparison between performance and competence curriculum and lastly the ten curricular spider-web/learning signals (Khoza, 2015c; Van den Akker et al., 2009) which are explored and subsequently used to frame this study. In addition to the above, this chapter seeks to evaluate all curriculum related inputs. By input is meant documented opinions on curriculum matters, types of lectures utilised for successful teaching and learning, and resources managing practical components of vocational training received from both local (South Africa) and international scholars. Further, Fgure 2.1 below provides a flow chart that represents the structure of this chapter.

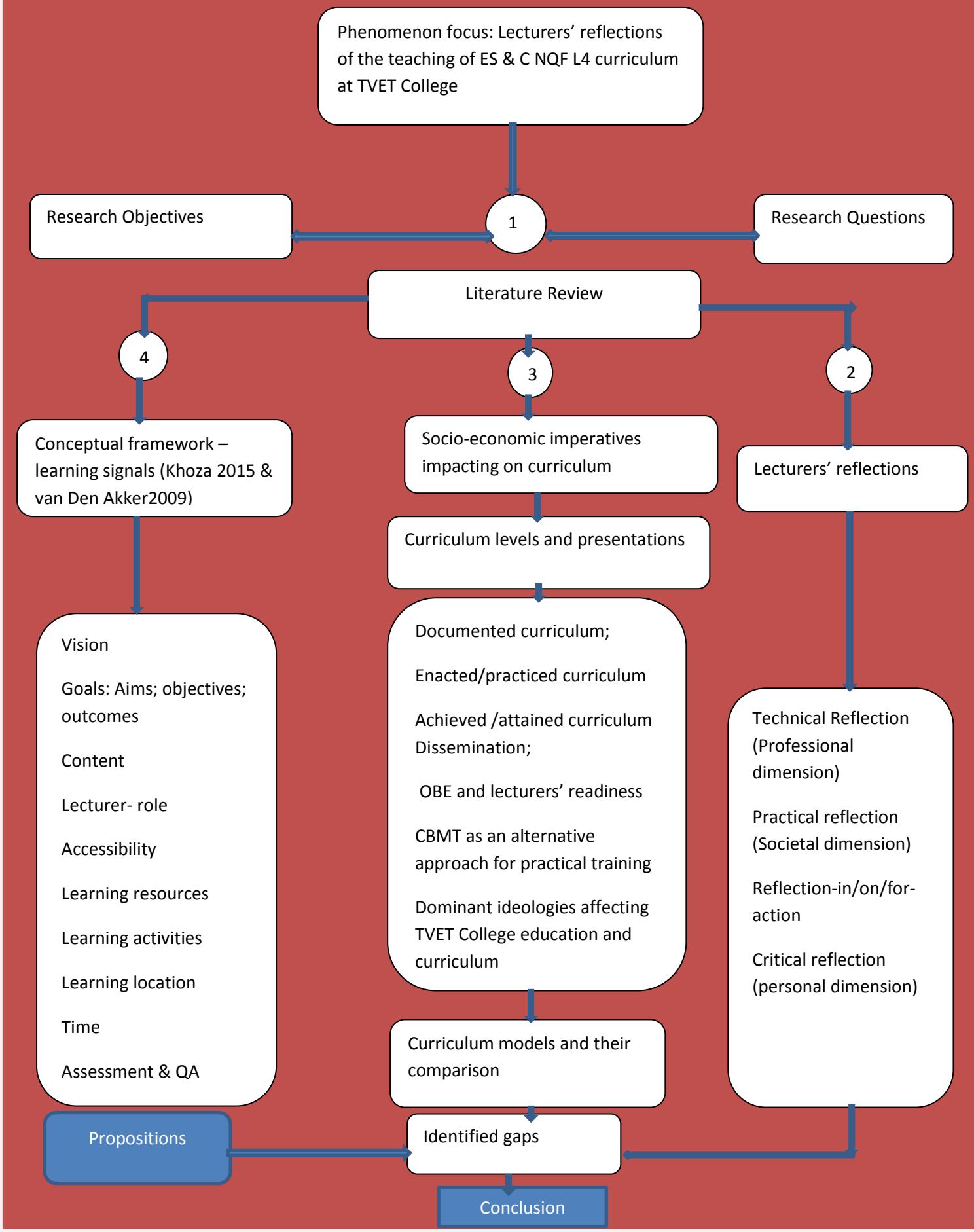

Figure 2.1 Literature review

2.2 Phenomenon (Lecturers' reflections)

Dewey. (1933) in his definition for reflections, maintains that reflections should be acceptable if they meet the following criteria, namely: functionality, and thoughtfulness of any convictions. Moreover, they acceptable if they display intelligence in the light of grounds supporting it, and the conclusions being made. Furthermore, van Manen (1977a) posits that reflection levels are divided into instrumental, communicative, and personal/pragmatic reflections. This research project presents reflection as reason, instrumental/technical, communicative/societal and personal/critical.

Dewey (1933) further qualified reflection by adding three attitudes essential for a reflection process to be effective and, these attitudes include: open-mindedness; responsibility and wholeheartedness. In the teaching context, the lecturer must be conscious of their beliefs and assumptions and should strike a balance between what is assumed natural right and, be open for alternative perspectives. Teaching being a journey, the lecturer should be open to other innovative teaching methods and ideas from their peers to enhance their teaching and learner success, and this may be achieved through reflections. Lecturers are responsible for students' development, success. Additionally, lecturers are accountable to their (students) academic advancement and social preparation for economic participation.

Moreover, continuous introspection and reflecting with peer lecturers may improve the lecturer's knowledge and enhance the opportunities for students to achieve desirable intended results. Thus, in the perspective of Electrical Systems and Construction (ES&C) NCV competence curriculum, which seeks to groom students for the world of work and employment opportunities, National Certificate Vocational (NCV) Policy (2006), lecturers awareness of curriculum transition and synergy between curriculum levels is crucial to ensuring that the curriculum political vision is achieved (Kehdinga, 2014)
.

Loughran (1996) asserts that reflections help individuals to learn from the know-how because of the empowering ilk of the inquiry into that knowledge.Furthermore, Loughran posits that reflection involves working towards an improved comprehension of problem solving strategies. In line with this, Dewey (1933) considers reflective practice as a critical element in curriculum delivery as it promotes reflective thinking. Killen (1989) supports the idea of reflective lecturers and further argues that through reflection, lecturers should review how they teach and why they teach in that particular way and thereafter explore opportunities for improvement in their teaching practice, which is in line with a quality improvement concept. In line with the above, lecturers' reflections need to be deliberate to gauge their effectiveness. Therefore, TVET College management should ideally promote reflective practice platforms in order to encourage high level thinking (Dewey, 1933).

In addition to the above, Carr and Kemmis (1986); Maxwell (2013); van Manen (1977a) and Taylor (2004) identified the three levels of reflection namely the instrumental/technical (professional

dimension), communicative/practical (societal dimension) and pragmatical/critical/emancipatory (personal dimension). (van Manen, 1977a) maintains that the technical level of reflection focuses on usage of didactic knowledge in a learning atmosphere that aims to support the attainment of learning outcomes. In other words, technical reflection level promotes professional and factual knowledge. In the context of ES&C NQF L4 curriculum which is dual-content, lecturers need to reflect on the appropriate delivery approach to be adopted so as to satisfy the effective delivery of theoretical knowledge and practical. Furthermore, the DoE Minister Pandor (2006) mandates lecturers to empower students with academic knowledge and theory (cognitive/ instrumental) mixed with practical (psychomotor/communicative) and values(affective/p ersonal) restricted to occupational area.. Therefore, this implies that NCV competence curriculum is a dual–content (offering theory and practical as learning/teaching components assessed as separate entities for students to get resulted). Furthermore, lecturers should reflect on the subject content delivery, their teaching and curriculum approaches to adopt as they dispense knowledge and skills to students taking the mandate into consideration. Moreover, Zeichner and Liston (1987) posits that technical reasoning encourages lecturers to reflect through application of educational criteria, through focusing at institutional context. In other words, for effective teaching to happen, lecturers should reflect on the campus learning environment, learning resources available and appropriate teaching methods and assessments. Lecturers should, on equal measure, acknowledge and consider practical reflection.

Practical reflection is concerned with lecturers application of principles that guide their teaching practices and this involves (lecturers) being concerned with the aims and objectives to being achieved (Van Manen, 1977b; Zeichner & Liston, 1987). Schon (1983a) concurs with Zeichner. and Liston (1987) and the commonalities are grounded on the following: Reflection-on-action which is aligned to technical reflection (Schon, 1983b) and is based on educational principles guided by previously attained wisdom/education to obtain the intentions of the documented/official curriculum. Similarly, the technical criteria (Zeichner. & Liston, 1987) encourages the use of the previously gained knowledge to attain the curriculum goals. Therefore, both the technical criteria and technical reflection aspire to achieve the common objectives which is the attainment of educational goals. This implies that lecturers should refer to the subject and assessment guidelines which are sources from the official curriculum document and also make reference to the NCV Policy 2006. Further to this Kehdinga (2014) asserts that reflection can be influenced by political dimensions. This is supported by Apple (2003) who argues that curriculum design is biased towards the views and philosophies of the ruling party thus educational design is political. The intended curriculum (Electrical Infrastructure Construction) underpinning principles, the social transformation and social participation reflects the ideological position of the National African Congress (ANC). Moreover, the Apartheid Government under the Nationalists Party implemented Bantu Education as part of the racial segregation policies to suppress Black South African

from accessing quality and progressive education. In the South African context, ES&C NQF L4, which is part of NCV curriculum is designed to vocationalise education in order to support industrialisation and furthermore address poverty, un-employment and equity**.** This implies that vocational education is a political tool that is meant to address both social justice and economic participation by competent students. Therefore lecturers should continuously reflect on their teaching practices to guarantee they are aligned with the vision in order to attain vocational goals as positioned by NCV Policy (2006) Chapter 1(3), and SAQA Qualification ID50441 (2006). However, practical reflection does not address issues of political power (Kehdinga, 2014) as accurately as critical reflection. Thus, this study delves into critical reflection as positioned by Carr and Kemmis (1986); Maxwell (2013) ; Smyth, McInerney, Hattam, and Lawson (1999); Taylor (2004); Valli (1997b) and van Manen (1977a) .

Maxwell (2013); Taylor (2004);Valli (1997a); Smyth et al. (1999) concur that critical reflection is a desirable reflection level for lecturers because it encampuses contemplating about the public, ethical, and civil aspects of schooling. This suggests that lecturers' reflection development growth level enables the lecturer to apply a holistic approach when dealing with teaching and learning dynamics and challenges. Further to this, Çimer, Çimer, and Vekli (2013) assert that pragmatic/personal reflection is perceived as a neutral stance that remains open minded, principled and ethical and understanding of didactic practices. Furthermore, it demands lecturers cogitate on practice with thoughtfulness and eagerness to challenge complex issues of college power and politics. Lecturers operating at a critical reflection level are encouraged to apply ethical criteria such as social justice. In line with ethical criteria and social justice, the ES&CL4-Subject-Guidelines. (2015) of the NCV curriculum objectives outline that the curriculum should strive to recompensate prejudiced inequalities and past imbalances and thereby fast-track employment prospects. In addition to that, the curriculum should provide to the universal development of the student by tackling moral accountability and ethical work orientation and lastly economic involvement. This implies that TVET College should inculcate the world of work culture through proper and effective education to create a smooth shift from TVET Colleges to the world of work. Lecturers should critically reflect on this matter (creating industrial culture for smooth transition between TVET College and the world of work) whilst keeping in mind that society relies on TVET college training as a solution at empowering youth to realise their importance in the economic participation. Furthermore, studies indicate that critical reflection is about challenging and testing out why they practice their teaching as lecturers and being prepared to act on the results (van Manen, 1991; Zeichner & Liston, 1987).

Further to this Schon (1983a) identified two additional reflections which are: reflection-on-action and reflection in-action. He articulates that reflection-on-action is an after event thinking and therefore, lecturers utilise this previous experience when planning for the future. Schon (1983a) further posits that should there be an unexpected student reaction or perception while the lesson is in progress, the

lecturer's immediate response to the incidence is regarded as reflection-in-action. The implications of the narrated concepts imply that lecturers should continuously reflect on their experiences and review their teaching theories when deemed necessary in order to yield desirable results. Additionally, the lecturer should always be constantly alert of what is transpiring in the classroom and be able to immediately correct behaviours that may hinder effective learning, and equally be able to continuously evaluate their own practice. However, lecturers should be aware of the links and relevance of the two reflections compared to technical, practical and critical reflections. Reflections-on-actions is about the application of didactic principles in teaching and learning which corresponds with the purpose of technical reflection. Furthermore, reflection-in-action corresponds to practical reflection because the lecturer takes corrective action while curriculum is in action. What is noticeable also is that Schon in his reflection- on- action and reflection –in – action is concerned with present and past and seem silent about the future which would have included reflection – for – action.

In line with the above, Smyth et al. (1999) identified three dimensions for reflection that are worth being noted in order to enhance understanding of reflection on-action-in-action (reflection –on-action and reflection-in-action) and reflection for-action. For-action encampusses the lecturer cogitating during teaching practice (present) and lastly on-action involves the lecturer investigating the success and failures of teaching practice (past). Therefore, lecturers should take advantage of their teaching know-how and should continuously re-assess themselves to improve their professional teaching practice (Impedovo & Malik, 2016).

Similarly, Khoza. (2013a) posits that reflection awareness is important since it minimises the existing gaps between theory and practice. Correspondingly, Orland-Barak and Yinon (2007a) conducted a study on three student teachers who reflected on their understanding of the connection between theory and practice in their learning environments. The results of the investigation revealed the significance of connection in any activity that put programme of study in action/practice. Thus, the study concluded by stating that the connection between theory and practice assists lecturers to develop grounded theories of practice and practical theories of curriculum. Pedro (2005) also adds value in the reflection knowledge bank when his study on student teachers revealed the importance of the reflection opportunity which he maintains encourages self-reflection, verbal reflection and written reflections, which are factors promoting critical thinking (Orland-Barak and Yinon (2007a). In the context of ES & C NQF L4 NCV curriculum, lecturers are expected to reflect on how they organise and prepare both the theory and practice (technical/professional dimension) to support learners to achieve appropriate competence level. The study has revealed vast knowledge of reflection and reflective practice however, it is also vital to know their merits and de-merits.

2.2.1 Merits and challenges of reflections

One of the merits of reflection is that it encourages lecturers not to rely on their sub-conscious-mind, instead to use their conscious minds in finding solutions for academic challenges. Furthermore, through reflection, lecturers may review how they teach and why they teach. In addition, lecturers may thereafter explore opportunities for improving their practice through reflection, which may subsequently lead to them taking a conscious responsibility and accountability in their professional actions. Moreover, reflective practice encourages lecturers to perform in a thoughtful, purposeful way. Thus reflection assists liberating lecturers from routine conduct, implying that by gaining better comprehension of their personal unique teaching and practice, lecturers can improve their effectiveness (Çimer et al., 2013). The challenge is the lack of cooperation from the management to support a reflective culture, and budgetary constraints is a main reason for not financing such initiative. Moreover, lecturers are overloaded with academic work and may not have time to attend the reflection workshops.

Additionally, Falkenberg (2013, p. 4) posits that the colleges have a social responsibility mandate to support the "betterment of society" through education, in order to address social inequalities, gender inequality, lack of tolerance, lack of democratic engagement and environmental destruction, which in turn becomes a direct responsibility of lecturers in that college to voice their concerns and disapproval of such adverse practices. Further, TVET College campuses are sometimes troubled by students' unrest commonly related to National Financial Aid Scheme (NFAS), leading to disturbances and disruptions of teaching programme (College politics). Thus, lecturers lack of reflection knowledge at critical level, compromises and dis-empower lecturers at becoming effective in such situations. Correspondingly, Çimer et al. (2013) assert that personal reflection involves enquiring the larger structures of public and challenging the existing state of affairs and college politics which affects lecturers in their curriculum practice for students better results and employment opportunities**.** In line with the above, lecturers should be aware of the TVET College political mandate which is aligned to human resource development for participation in the economy and social justice agenda (Falkenberg, 2013). Therefore, these lecturers should be motivated to reflect on this mandate as positioned by NCV Policy 2006 and other relevant strategic documents, while being aware of their impact on the practiced and attained curriculum. Socio-economic transformation imperatives have significant impact on the TVET College system in South Africa and therefore it is imperative to know what impact socio-economic imperatives have on the National Certificate Vocational curriculum.

2.3 Socio-economic imperatives impact on the TVET College programmes (National Certificate Vocational curriculum).

This sub-section seeks to reflect on the socio-economic and political position of South Africa, where this current research project was performed, within a global arena. Furthermore, we explore the mandate

of the TVET College in a developmental state, the broader socio- economic vision and the impact to TVET College from education and training perspective. Moreover, the sub-section intends to explore the importance of the alignment between the socio-economic vision and the College mandate.

South Africa, as with most developing countries, wishes to position itself strategically in the global market in order to improve its economic growth and sustainability and thus has adopted a capable and developmental state position modelled from East Asian countries, namely: South Korean, Japanese and Chinese models (Burger, 2014, p. 4; Kuye & Ajam, 2012; National Planning Commission, 2012). Contrary to this Akoojee (2016) prefers renaming it as democratic developmental state as opposed to capable and developmental state. The developmental state is associated with Government strategy to address economic growth, and furthermore, addressing un-employment, poverty, equality as well as refining live-hoods of South Africans. Furthermore, the developmental state is characterised by state led industrial policies (Industrial Policy Action Plan 2 (IPAP2) and the NDP 2030), with Government actively supporting selected industries (State owned Enterprise (SOE) (Burger, 2014; Edigheji, 2010; Kuye & Ajam, 2012). However, the astronomical rise of the cost of living threatens the realisation of the matured and effectively functional developmental state**.** According to Evans (2010), the state (Government) must have capacity to formulate technical policies, analysis capacity, administrative capacity and political capacity for effective governance.

In the South African context, the National Development Plan 2030 (NDP) is the vision behind the capable and developmental state while the New Growth Path is the strategy used to achieve the political aspirations as positioned by the NDP 2030 vision which are the economic growth, employability to address the triple challenges namely: un employment, inequality and poverty (HRDCSA-TTT Report, 2014). Furthermore, the New Growth Path strategy is supported by Industrial Policy Action Plan 2 and driven by the Department of Trade and Industry in collaboration with the Department of Economic Development (DED) to promote industrialisation through the implementation of Strategic Infrastructural Projects (SIP) and Special Economic Zones (SEZ) (dti, 2014) to create employment opportunities and economic enhancement. The socio-economic vision cannot be achieved in the exclusion of (TVET) which is responsible for skills development to empower students with diverse technical expertise and competences for economic participation (DoE Minister Pandor, 2006; ES&CL4-Subject-Guidelines., 2015).

In line with the above, it may be important to know the definition of the TVET system. According to UNESCO (2007, p. 2), TVET is a learning system in which both "soft" and "hard" skills are developed within a "joined-up", integrated development and delivery framework that seeks to improve societal lives, promote inclusion into the world of work and supports community and individual agency. Similarly, the Federal Republic of Nigeria (2004) defined TVET as that aspect of education that leads to acquisition of practical and applied skills as well as basic scientific knowledge. The former definition

of TVET used integrated development and delivery framework which are terms associated with competence/societal/horizontal/everyday knowledge curriculum. Furthermore, the second definition used the term acquisition of the practical and applied skills which are also associated with horizontal and everyday knowledge (Bernstein, 1999; Bertram, 2012; Hoadley. & Jansen, 2013). Therefore, from the definitions point of view, the TVET system is meant to focus on learner knowledge building (what) and further the transfer of such knowledge to skills (how) for technical application and problems solving to enhance student competency and capabilities for participation in the economy. However, the two definitions have omitted the why reflection, which addresses the individual needs and identity. Based on the above, it is assumed that through technical education development, student's personal talent would be unearthed, and the individual student thoroughly developed for employment opportunities thus be better positioned to sustain own family financially**.** Furthermore, the TVET College system is divided into occupational directed (for example apprenticeship training and learnerships) and vocational discipline (NCV programmes) pathways. The role of TVET College system in a developmental state is unquestionable. However, the TVET mandate must be clearly stated in order to guide the enacted and attained curricula for relevance to both society and industry.

In the South African context, the Department of Higher Education and Training (DHET) is responsible for TVET Colleges and therefore should be responsible for presenting the TVET College mandate. However, while TVET Colleges fall under the jurisdiction of DHET, the product (graduates) of the TVET College system are expected to serve industry and society in general with relevant knowledge, skills, values/attitudes and competences. Therefore, stakeholders outside the DHET are also crucial components in deciding on the TVET College mandate content. Therefore, this section seeks to present the views of DHET senior management on what is the mandate of TVET College system in South Africa.

The Minister of higher education and training (DHET) in his NCV 2009 report, indicated that NCV curricula is planned to respond to priority skills demands of the Democratic South African economy through exposing students to high skills and knowledge. He further stated that the practical component of the NCV programme (ES&C NQF L4) may be presented in the place of work or in a simulated workplace settings permiting students the chance to experience work situations during their period of study (Minister-DHET, 2009). Similarly, DoE Minister Pandor (2006) alluded that the National Certificate Vocational NQF L4 is expected to prepare students to obtain knowledge (which answers the what?), skills and competences (which responds to how?) and the values and attitudes (to respond to why?)

The Policy further stipulates that at ES&C NQF L4 students should be ready to articulate to higher educational institutions and moreover, to obtain employment in their chosen trades. Moreover, SAQA Qualification ID50441 (2006, p. 1) National Certificate: Vocational L4 summarises the aims of the

qualification as following: “To equip students adequately for entry into the world of work by providing them with practical knowledge and skills related to a particular economic or vocational sector and furthermore, to provide students with knowledge, skills, attitudes and values to enable them to access learning in higher education band”. Furthermore, Post School Education and Training (PSET) Drector General (DG) posits that PSET is responsible for outcome five (5) of the South African Government 14 outcomes, which is to “produce skilled and capable workforce to support an inclusive growth path**”** (DHET-Senior-Management., 2016, p. 28). At a Supra-level (international), Tikley (2013) alludes that the TVET College system is responsible for human capabilities approach which is understood as instruments for developing multiple of skills, aptitudes and competences. Furthermore, capabilities are described in relation to framework, and can possible “contribute to economic, social, political, environmental and cultural development” (Tikley, 2013, p. 4).

Based on aims of the qualification mentioned above, it is clear that the mandate of the TVET College system according to DHET, is to produce a proficient and skilful workforce to upkeep an inclusive economic expansion. In addition, theTVET system is mandated to provide student with relevant skills knowledge, values and attitudes to articulate to HE institutions**.** Similarly, the DHET Minister emphasised the importance of students’ practical capabilities as a key area for employability opportunities enhancement. This implies that TVET College system offers students opportunities for self-development as part of preparation for participation in the economy. The TVET College system if implemented effectively, may yield positive results thus the best form of human empowerment is by ensuring that each citizen is educated and trained in technical and vocational skills to be able to produce goods and services for national development**.** Furthermore, UNESCO and ILO (2002) aver that education and proficiencies creation results in less unemployment and more equity in employment. In addition, economy turns out to be more fruitful, innovative and economically viable through the presence of more competent human potentials. Various studies reveal that in South Africa and elsewhere, TVET Colleges are generally staffed with lecturers who have poor or no practical and industrial orientation, training resources availability for training being a huge problem that leads to lecturers over-theorising (Adam et al., 2015; Dasmani., 2011; Gamble, 2013; KZN Planning Commission, 2016; MTT Final Report, 2013; Serumu, 2015; Wedekind, 2016b; Zungu & Munakandafa, 2014). However, the goals of the South African Government are to accelerate improvement of economy through Radical Economic Transformation (RET) and further create social cohesion among its citizens (National Planning Commission, 2012)**.**

Thus, lecturers’ reflections on the teaching of ES&C NQF L4 NCV integrated/competence curriculum, may assists in the alignment of their practices to meet DHET strategic outcomes and the South African Government socio-economic goals. Moreover, reflection may promote the awareness about the broader responsibilities of the college community to South Africa transformational agenda and skills development imperatives. Therefore, it is apparent that the economic development, social

reconstruction agenda are dependent on quality of technical education and training provisioning through vocational discipline and occupational directed pathways. Thus, quality curriculum is a key factor for successful technical education and training interventions to economy. However, the alignment of the Government socio-economic goals with the TVET College mandate on skills development may be impossible in the exclusion of curriculum.

2.4 **Curriculum levels and presentations**

Various scholars have different opinions about the watertight definition of curriculum. Marsh. (1997) maintains that curriculum can be described as an artefact or manuscript that incoporates facts about goals, objectives, content, teaching techniques, evaluation and assessment and resources. On the same line of thought, Khoza (2016) concurs with Berkvens. et al. (2014) that curriculum can be expressed as either a plan for teaching or learning when viewed from the intended perspectives or a plan of teaching when viewed from the enacted curriculum perspective. Furthermore, curriculum comes from Latin the word currere which means to run a course (Hoadley & Jansen, 2013; Pinar, 2012). Similarly, Van den Akker et al. (2009, p. 9) are agreeable with Taba (1962) that curriculum is a "plan for learning".

Furthermore, Van den Akker et al. (2009) assert that curriculum can be perceived from five levels. The Supra is international, furthermore, examples may be educational and training instructions and resolutions from UNESCO to member states, common international framework of reference for TVET Colleges, climate change and United Nations resolutions for interventions and responsibilities of member states. The Macro-level is national. Examples are curriculum plans, national vision and strategic goals, curriculum frameworks, subject and assessment guidelines, national external assessments plan, monitoring and evaluation tools and ES&C NQF L4 curriculum. The Meso-level which takes place at TVET College level for instance syllabus scheduling across multi-campuses, College programmes, College policies and College memoranda. The Micro-level which takes place at campus classrooms and workshops for example textbooks and other instructional materials, soft-ware and hard-ware resources for everyday and lastly the Nano-level which is individual and for lecturers and students informed by their individual habitual actions. From knowledge transmission efficiency perspectives, it is worth noting that throughput (achieved curriculum) can only be equivalent to input (intended curriculum) when there are no losses (caused by mis-interpretation) in the practiced curriculum. Therefore, the next paragraph presents curriculum layers.

Curriculum may be represented by three main layers (Khoza, 2015b). The first layer which (belongs to curriculum developers) is the intended/planned/prescribed/official or formal curriculum. This layer presents a documented strategy, subject and assessment guidelines that are framed by educational vision with goal/s as well as the intentions of the teaching/learning curriculum (professional/factual documents presenting educational plans).

The second layer (belongs to lecturers), is the implemented/enacted or practised curriculum, also known as curriculum in action (Khoza, 2015b) which is the interpretation of the intended curriculum as observed or "seen from the lecturers perspective and the actual process of teaching in operation" (Khoza, 2015b, p. 103). The last layer, which (belongs to students), is the attained/achieved or assessed curriculum, presents the learning knowledge as seen by students representing individual identity and character, each student has their own personal interpretation of meanings (as evaluated through their accomplishment of learning results (Berkvens. et al., 2014; Khoza, 2016). Angelis and Marock (2001), contend that structured and potentially effective curriculum comprises of the curriculum framework. The framework embraces rationale, scope and parameters, targets and reasons of the subject areas, procedures for course design as well as guidelines for evaluation. However, the curriculum and assessment policy statement (CAPS) document regards purpose, aims and specific aims as key components to be added on the curriculum framework. Furthermore, the subject guidelines and assessment guidelines (NCV), goals includes the subject outcomes and learning outcomes as part of the curriculum framework but have excluded aims (long-term goals viewed from personal perspective) and objectives (short term goals viewed from the lecturers' perspective). Nevertheless, the objectives of the NCV programmes are captured in the SAQA ID 50441 document.

Additionally, international experiences from the Caribbean Government, through Caribbean Advanced Proficiency Examination (CAPE), reveals that there are five goals developed that the Electronics Technology syllabus is expected to adhere to and accomplish. In addition to that, the CAPE presents six aims to be achieved (Caribbean-Examinations-Council, 2006). By the same token Deißinger (2011) contends that in Germany, Competence Based Education and Training (CBET) which is a method for vocational education and training, focuses on competences (psychomotor), knowledge (cognitive) and attitudes (affective) as critical areas. In other words, the curriculum designers specify programme goals and objectives as a guide to lecturers and trainers. The Caribbean and Germany Governments endeavour to align their programmes to set goals, objectives, and outcomes at Macro and Micro-levels in order to give guidance to instructors, facilitators and lecturers. However, the lack of synergy between the documented, the practiced and the achieved curriculum results in a low throughput (NCV programmes examination results 2007), depriving students with employment opportunities. Moreover, DHET, employer stakeholders and parents registered concerns on the quality of teaching and learning (Gewer, 2016; HRDCSA TTT Report, 2014).

Lecturers knowledge and reflection of the teaching of ES&C NQF L4 NCV competence curriculum may yield positively attained results. This suggests that the practiced curriculum is a critical space of the enactment of the intended programmes of study, and the attained curriculum mirrors whether role players at the implementation phase are in synchronous with the documented curriculum. The success of the systems process (achieved/attained curriculum) is dependent on how the documented curriculum is interfaced with the enacted/implemented curriculum. Therefore, continuous monitoring and lecturers'

reflecting of their practice to find curriculum solutions is ideal. Carl (2002) and Briggs and Sommefeldt (2009) concur that key curriculum transformation drivers are lecturers (for TVET College), community, government and industrial stakeholders. Furthermore, Carl (2002, p. 24) asserts that for South Africans to find solutions to curriculum related challenges, "reflections on curriculum studies, curriculum development, curriculum intentions (documented), implemented or practiced and attained curriculum is essential". In addition to this, Carl avers that challenges occur predominantly at the enacted/implementation phase and are caused by the lack of curriculum theory knowledge and curriculum vision**.** Therefore, in the perspective of curriculum transformation and change management, the preparations of lecturers for such change, the unpacking of Outcome Based Education (OBE) approach, mobilisation and alignment of resources to meet the new programme needs are all very critical for effective implementation of the new programmes. Contrarily, it is well documented that NCV programmes are competence based and thus subscribe to OBE philosophy. However, lecturers' preparation was not given priority and curriculum dissemination not done effectively (Carl., 2002; Hartley et al., 2008a; MTT Final Report, 2013; Wedekind, 2016a).

2.5 Curriculum dissemination

The curriculum dissemination phase is theoretically located between the intended phase (design phase) of the documented curriculum and the implementation phase. According to Carl (2002), the function of the dissemination phase is to generate a conducive and permitting atmosphere for the envisaged change including the preparation of curriculum users/implementers. Curriculum implementers are prepared at this phase through the dispersal of communication, opinions and concepts to make them aware of foreseen curriculum and furthermore, Carl (2002, p. 143) adds that "renewal has often failed because of defective/injudicious dissemination". In addition to that, Carl (2002) argues that the institutionalisation of dissemination is crucial, and emphasises that the curriculum implementers should be encouraged to accept and embrace the change as part of their curricula practice with necessary empowerment programmes being implemented to support lecturers. The curriculum renewal, especially the NCV, which produced results that did not mirror the documented or intended curriculum, revealed a dearth of synergy between the practiced and the intended curriculum resulting in multi folded challenges (Rasool & Mahembe, 2014). Curriculum dissemination processes and lecturer's empowerment to cope with the change appear to have been overlooked by the custodians of change namely the Department of Education, KZN Provincial Education and TVET College Management. Additionally, the curriculum delivery approach driving philosophy is Outcome Based Education (OBE) (SAQA Qualification ID50441, 2006) while the model chosen being the Competence Based Education and Training (CBET). Moreover, lecturers were only armed with textbooks, subject and assessment guides as the only ammunition at their disposal to face curriculum transformation. On the contrally, schools (FET phase) went through a huge pedagogical overhaul as part of alignment with curriculum

changes, and this was applicable to teachers targeted to teach Grades 10-12 Mathematical literacy (new content).

Equally, due to curriculum transformation and transition from National Senior Certificate (NSC) C2005 and later to CAPS, teachers were academically prepared through attending workshops (provincially and regionally) to align themselves with the new curriculum. However, these workshops provided content knowledge support and excluded the ideological-ware (which is a pillar) resulting to poor pedagogical grounding (Khoza, 2015b; Khoza, 2018; Khoza., 2013a; Koehler. & Mishra, 2009). Contrary, TVET College lecturers were only provided with new NCV textbooks, subjects and assessment guidelines to face the new curriculum. There was no lecturer empowerment to confront the new dual-content curriculum. Ideological-ware provides lecturers with pedagogical grounding to be able to enact/implement the intended curriculum policy however, this support was not provided. For ES&C NQF L4 curriculum, the OBE underpinning principles and objectives (IW) needed to be understood by lecturers beforehand are not included in the subject and assessment guidelines. Thus, lecturers used the subject and learning outcomes in the enactment of the NCV curriculum. Based on this discussion (dissemination), it may be suggested for lecturers to reflect critically on future curriculum changes in order to be ready to face such challenges.

In the South African context for TVET Colleges, curriculum transformation meant a shift from Report 191 instructional programmes which is vertical/lecturer-centred/school knowledge and performance based guided by international standards to OBE (student-centred and activity-based) which is competence-based/integrated curriculum guided by public opinion. However, this seemed to be a blind shift for lecturers at Micro-level as they were not aware about the OBE underpinning principles and objectives (Hartley et al., 2008b). Transformation agenda was driven by socio-economic, political, and content rationale leading to the adoption of a multi- purpose curriculum agenda aimed at addressing new content (knowledge content and the OBE approach) as well as the social justice agenda. When NCV programmes were conceptualised and implemented in 2007, the countries' economic vision was based on Accelerated and Shared Growth Initiative for South Africa (ASGISA). Further, the education and training vision was based on Joint Initiative for Priority Skills Acquisition (JIPSA), which focused on priority skills (Hartley et al., 2008b). The significance of JIPSA to technical education and the FET sector is that twelve (12) NCV programmes were implemented in 2007 and the Electrical Infrastructure Construction NQF level 2-4 learning area was one of those implemented programmes. Furthermore, the NDP 2030 vision (political vision) and New Growth Path (an economic revival strategy) meant to address economic and social misfortunes (White-Paper-PSET, 2013). In addition, the White-Paper-PSET was introduced as a new focus impacting fundamentally on Post School Education and Training system especially the TVET College sector.

Over and above, pertaining to Electrical Systems and Constructions (ES&C) NQF L4 NCV curriculum, studies reveal that lecturers were having difficulties at interpreting the curriculum as positioned by the NCV policy 2006, which puts the implementation or enactment process at high risk thus resulting in undesirable outcomes (National Planning Commission, 2012; Rasool. & Mahembe, 2014). Furthermore, Hoadley and Jansen (2013, p. 96) added that " lecturers inevitable interpret the curriculum according to their own knowledge, experiences, individual preferences, talent, personal politics and ideology", thus this may have huge adverse consequences when the programme is practically-oriented because the instructors might choose topics with which they are comfortable, especially inexperience instructors. Moreover, the curriculum interpretation is influenced by the lecturers' knowledge of the subject-content and the educational approach used to drive the ES&C NQF L4 NCV competence curriculum. Therefore, the function shifts from instructional Report 191 programme which is lecturer-centred, content-centred, examination based dominated by cognitive domain and school knowledge**.** Contrary, OBE is student-centred/activity based/ integrated and competence curriculum that is dominated by societal opinion (Bernstein, 1999). Lecturers were teaching both NCV curriculum and Report 191 not acknowledging that each programme required a different approach (Gewer., 2016). This practice resulted to poor education and training which is regarded as main cause of unemployment, confirming that unemployment is a key factor in social exclusion and economic instability (Clayton, 1999; Jarvis, 2004).

Additionally, lecturers' reflection of the teaching of ES&C NQF L4 NCV competence curriculum may add value in finding potential causes of confusions in the enactment of curriculum.

2.6 Outcome Based Education (OBE) an approach for TVET College

While the South African Basic education school system has migrated away from Outcome Based Education (OBE) tactic to Curriculum and Assessment Policy Statements (CAPS), TVET Colleges are stuck in the OBE system for numerous reasons. Therefore, this calls for TVET College society to comprehend the OBE approach in order to achieve broader aims. The aims include: To equip students sufficiently for access to the world of work by affording them knowledge, skills, attitudes and values attached to a specific economic or vocational sector. Furthermore, DoE Minister Pandor (2006) and SAQA Qualification ID50441 (2006) are agreeable that students should be provided with academic knowledge to articulate to higher educational institutions. This sub-section seeks to present the views of scholars in defining/describing OBE, present the history, and furthermore, outline the scholars' views on the South African OBE context. In Addition to that, it elaborates on competence standards, and present the merits and demerits of OBE. Spady (1994); Chu, Fong, and Tan (2010); Lam (2009), and Hartley et al. (2008a) all concur that OBE may be described as an achievement-oriented activity-based, learner-centred education and training practice, making it explicit what a student should recognise and accomplish at the end of each learning stage through directing assessment towards the achievement of

specific outcomes. In addition to the above, Killen (2000); Spady (1994); and Lumbly (2007) assert that OBE is classified into three categories namely: the traditional, transitional and transformational OBE. According to Killen, the traditional OBE is based on traditional content approach to education where outcomes are derived from the instructional aims based on syllabus content, and the educational aims focusing on the mastering of the content. Furthermore, Killen. (2000) contends that transitional OBE measures students learning outcomes based on higher competences such as critical thinking, problem solving, communication skills, technological applications and team work. Similarly, Spady (1994); Killen (1998) and Lumbly (2007) agree that transformational OBE is designed around long term-outcomes which relates to life-long learning responsibilities of students including being a productive worker, participative citizen in economic and social life, technical capabilities, industrial culture and ethics required by the engineering and manufacturing.

OBE history is traced from United States of America and other Western nations who emphasised the need for high-tech culture, productivity and competitiveness in the workplace for global economy participation, and therefore, adopted skills model for vocational education and training (Killen., 2000; Lumbly, 2007; McCarthy, 1993). In the South African context, OBE is traced from Australia, New Zealand and UK (Jansen, 1997). Additionally, South African OBE approach emanates from the Competence Based Education and Training (CBET) model which is regarded as a global benchmark for TVET Colleges curriculum (ILO, 2004; WorldBank, 1991).

Studies reveal that the global communities use different names for Outcomes Based Education approach, for an example Germany and other European countries use CBET (Deißinger, 2011). Similarly, Asian countries such as China use Outcome Based Teaching and Learning (OBTL) (Biggs & Tang, 2007; Chu et al., 2010)**.** Equally important to note is that all these approaches have common features, namely: the learning approach is activity biased, they promote student-centeredness where outcomes are privileged over input and learning processes, focus is on what the student knows and consequently can do as a result of education and training**.** Furthermore, scholars are agreeable that competence/horizontal/integrated curriculum is based on the principles of OBE (Hoadley, 2007; Hoadley. & Jansen, 2013; Jansen, 1997; Khoza, 2015b; Muller, Davies, & Morais, 2004). For effective enactment of OBE approach, (teaching of ES&C NQF L4), lecturers must know the OBE underpinning principle as captured on DoE (2002, p. 10); SAQA Qualification ID50441 (2006, p. 2) and DHET ES&C L4 AG (2015, p. 3). Moreover, lecturers should also understand the stated objectives to be able to drive the programmes effectively with confidence. Therefore, lecturers' critical reflections on the OBE objectives and underpinning principles and further, implications on their practice to attain assessed and broader goals is essential.

In the South African context, curriculum transformation appears to be more focused on the main stream school system. The evidence of this is the transformation the nation witnessed during the era of DoE

Minister Bhengu when he introduced curriculum 2000, and furthermore the Revised curriculum 2005 during the tenure of Prof Kadar Asmal administration (Mpungose, 2016). In addition to that, the DBE Minister Angie Motshekga introduced the Curriculum and Assessment Policy statement (CAPS) which is a vertical/performance curriculum based on international standards (DBE, 2009), currently practiced nationally in all Government controlled schools. Over and above, the OBE approach is driven by the transformation agenda and has multiple challenges which are well documented by different scholars, and due to academic challenges was eventually replaced by CAPS in the main stream school system (Motshekga, 2011).

In South Africa, the main-stream school system is a major feeder to tertiary educational systems. Universities (Academic and Universities of Technology) are preferred destinations for students who are academically high achievers and TVET Colleges are the last resort. However, all these institutions are responsible for student's further growth in personal development, self-identity, and character**.** By the same token OBE was introduced in 2007 to drive the National Curriculum (Vocational) known as NCV of which ES&C NQF L4 is currently part of. In addition, theoretical knowledge (cognitive), skills (psychomotor) and values (affective and industrial culture) are key competences expected to be developed for students employability. Students being at the door-step of industry and HEI institutions, require an approach to education and training that is more student focused to provide space for self-development, preparation for industrial cultural alignment and for economic participation. Over and above, critical and practical reflections of lecturers teaching ES&C NQF L4 on how they intend to align their curriculum practices to assist students in attaining the intended outcomes is crucial. Moreover, it is critical for lecturers to comprehend OBE as an approach, its history, underpinning principles, and the implications to vocational discipline programme which is dual-content. Furthermore, the knowledge of OBE as an education philosophy (ideological-ware) is as important as the subject-content knowledge to both the students and lecturers. In the academic world, international standards are only associated with performance/vertical curriculum, in other western countries OBE driven occupational training is also governed by competence standards in order to promote compliance to productivity, and global competitiveness. Therefore, the following paragraphs explores the competence standards.

2.6.1 Competence standards

Scholars including, Deißinger (2011, p. 105) posits that Germany CBET approach is centred around three category types of competence standards which are: "industry standards, cross-industry standards, and enterprise standards", and in line with quality and skills standards, Dai and Nguyen Quang Viet (2012, p. 18) opined that in Vietnam, the Vietnam TVET system is guided by the "structure of national standards on occupational skills which consist of three basic components" , they are:

- Occupational description which is the description of the scope, work based, and environmental perspectives of task execution, required tools, machines, equipment, devices for task performance
- Job inventory which is fully listing tasks to be performed and arranging such task based on occupational skills levels.
- Task performance standards made of sub units namely: a) Task description; b) Performance criteria; c) Essential skills and knowledge and d) Performance conditions.

In the South African context, especially the ES&C NQF L4 NCV curriculum, the assessment guides provide assessment standards which represent the views of DHET. Surprisingly though, the voice of potential employers, standards generating bodies, and quality assurance is excluded. Based on the latter statement above, it may be important to compare what students know and are able to do with performance indicators, namely: the course completion rates, number of students admitted at HEI, and post-course employment rates as a barometer to measure the success rate of OBE implementation at TVET College campuses. Furthermore, there is a need for practical reflections to hear the voice of lecturers teaching ES&C NQF L4 NCV curriculum to establish whether there is alignment and correlation between results achieved by students to the intended learning outcome (ILO). Additionally, the alignment and correlation may be measured against subject and programme goals.

2.6.2 Merits and Demerits of OBE

According to Killen (2000), in Australia, a need for public schools to be accountable for what learners are able to do after completing a particular level of education resulted in OBE being implemented. In this regard, learning outcomes achieved by an individual student in the programme per level and the critical outcomes were seen to reflect what a student can do post those learning activities**.** In the South African context, OBE was found to be NQF and SAQA friendly especially as it is outcome and assessment driven, which is a pre-requisite for qualifications to be registered in the NQF system (Lolwane, 2001; Lumbly, 2007). Furthermore, the ES&C NQF L4 NCV curriculum, subscribes NQF standards and its philosophy and therefore will carry "productivity, economic competitiveness and social justice" tones in support of OBE as per the argument of Lolwane (2001, p. 107). Moreover, Basri, Man, Badaruzzaman, and Nor (2004) and (Chu et al., 2010) concurred that for quality improvement of OBE, there is a need for a continuous quality improvement (CQI) system to be adopted by the educational institutions as this has been a case with the Malaysian university where OBTL approach was used. In line with the CQI, employment stakeholders develop trust in the university product and this creates more opportunities for graduate placement and employment. Over and above, Basri et al. (2004) contend that higher education institutions, use project-based learning (PBL) which adds value to education and training systems through promotion of integrated learning environments. Furthermore, it empowers students to critically make personal sense of knowledge acquired for self-development and for socio-economic participation.

OBE/OBTL/CBET approaches are unconditionally welcomed especially because of the emphasis they place on outcomes which are to be achieved by students at the end of learning or training. Lam (2009) asserts that one of the merits of OBE is that it provides students an opportunity to develop employability skills and groom them for effective involvement in labour markets. This implies that OBE enhances students' social efficiencies for meaningful participation in the labour market. However, students' practical proficiency can only occur if qualified, technical competent, and continuously develop their skills, to meet the structural changing world of work needs. Furthermore, the TVET College sector in South Africa does not have proper guides of entry qualification requirement for lecturers, unlike in the school system and in other countries, namely EU and other Asian countries. The lack of guidance compromises the product standards and quality.

In the South African context, OBE implementation effectiveness is measured by students' attainment of the programme level learning outcomes. On the contrary, the critical and developmental outcomes effectiveness, in terms of educational, and social reconstruction goals impact needs to be investigated. Therefore, there is a need for such a study to be conducted for TVET colleges vocational discipline areas. Furthermore, the failures and successes of the OBE approach are only seen from the DHET point of view rather than from the broader vision and employment stakeholders' point of view. Moreover, reflection by lecturers of alignment of the projected outcomes and achieved outcomes is essential. Furthermore, the reflections may also assist lecturers to consider the application of continual quality improvement (CQI) strategies which may improve students' performances and practical capabilities. The practical capabilities in the context of ES&C NQF L4 is not possible without a structured practical programme and therefore the competence based modular training (CBMT) may assist in creating structured practical training in the ES&C NQF L4 dual-content.

2.7 Competence Based Modular Training (CBMT) (proposition) a solution for structured practical training

This sub-section seeks to explore the Competence Based Modular Training (CBMT) as an alternative to providing structure or guide in the training practical component of the NCV engineering programmes in South Africa TVET Colleges which are currently missing dual-content. Therefore, CBMT will be defined or described, highlight international experiences from European Union (EU) countries that used CBMT. The sub-section also presents the requirements for effective implementation, share South African experiences gained when the CBMT was practiced during the Industrial Training Board (ITB) era. Moreover, it presents the impact of the transition from ITB to Sector Education Training Authority (SETA) implemented in year 2000. Studies conducted by different scholars revealed that knowledge on TVET College practical practice prior to the introduction of Skills Development Act and other supportive legislative framework is limited (Gewer., 2016; Wedekind, 2016a).

The CBMT is an individualised training strategy which is learner-led in nature, aimed and focused on the ability of a learner to master a specific skill thereby displaying competence. Cornford (1997) alleges that modularisation of programmes entails enveloping of modules content be it the theory or practical in summarised, logical self-contained components, which mutually embraces the content that would have been covered by a conventional longer programme. In addition to that, the modularisation is packaged in a user-friendly manner for the student and the instructor (Cornford, 1997).

2.7.1 Why CBMT?

According to a study conducted on EU countries who used CBMT in their IVET system, the European Centre for the Development of Vocational Training (Cedefop) found the following reasons which motivated for their adoption of the CBMT: It affords greater flexibility for the content to be tailor-made to meet continuously changing industrial needs and promote link with the labour market. In addition to this, the CBMT increases students' participation rates and reduces early dropouts. It also combats high youth unemployment (Cedefop, 2015). Furthermore, Cedefop (2015, p. 8) in their study, posits that in some cases the "CBMT offered students the flexibility to select courses and competences that are of interest to them". However, the study also revealed that in Finland and Denmark the perception is that the learner-centred approaches appear to pose challenges linked to students' ability to take responsibility for making choices and identifying learning goals. In line with the above, Cornford (1997) contends that modular course content designers frequently make inappropriate postulations around the readiness of students to learn from such modular course content, and their capacity to participate in meaningful self- testing and self-interrogation which are critical for successful knowledge acquiring and long-term memory capacity. The above scholars presents counter-arguments (based on experiences from Denmark and Finland) of advantages presented as reasons for motivation for using CBMT. The above implies that lecturers and instructors should profile students in order to know their academic and technical capabilities to be able to provide relevant support. Moreover, lecturers and trainers' reflections (ES&C NQF L4) on the adoption of the CBMT (outcome-based) as a solution to the current unstructured practical system may be necessary and crucial. Furthermore, reflections may also provide the opportunity to explore the values of CBMT implementation to address practical component guidance not provided in the ES&C NQFF L2-4 subject guides which finally may point to the restoration of practical training integrity, credibility plus employer stakeholder confidence on TVET College students for work force recruitment or further training.

2.7.2 Requirements for effective CBMT and credibility to employer stakeholders

Cedefop (2015) contends that there is a neccessity to re-inforce connections between training and the workplace as well as to allow education and training to to answer to the employers wishes. However, this can be realised only if the CBMT system is effective, credible, reliable and trustworthy, which implies that the CBMT system must be quality assured and comply to set industry standards. Cedefop displays concerns on the relevance of the CBMT to meet business community desires. Furthermore, Cedefop (2015) and Cornford (1997) concur that for the CBMT system to be effective and credible, it must be goal driven, where students' performance is guided by industrial standards. However, training success can only be achieved if training resources, structured practical modules, accredited infrastructure, time and competent instructors are available.

Moving to the current TVET College situation (South African context), the ES&C NQF L4 curriculum is outcome/competence/integrated-based and dual-content (theory and practical). While the theory is structured, the practicals are not structured which reduces opportunities for students to attain competence levels expected by industry and employer stakeholders. Some of the instructors (for practical training) lack the practical knowledge and industrial exposure. Furthermore, the absence of practical framework combined with lecturers' practical deficiencies, affect negatively the quality of students training. Moreover, it is documented that instructors end up using Integrated Summative Assessment Tasks (ISAT) the final practical assessment tool provided by DHET as a training guide (Adam et al., 2015; Dasmani., 2011; Gamble, 2013; Gewer., 2016; HRDCSA TTT Report, 2014; MTT Final Report, 2013; Umalusi Quality Council Report, 2012; Wedekind, 2016b; Zungu & Munakandafa, 2014). However, the adoption of CBMT to create NCV practical framework for ES&C NQF L2-4, can add value in finding solutions related to the lack of practical structure and the use of ISAT as a structure.

However, history reflects that the CBMT approach is not in conflict with OBE since both are, student –centred learning, competence and assessment-based. Therefore, if CBMT could be adopted, it may assist to provide structure to the practical content of NCV engineering programmes. Furthermore, it is documented that the majority of the lecturing cohort are graduates from the Universities of Technology and TVET College graduates "with no industrial exposure yet the NCV requires 60% practical" (Wedekind, 2016b, p. 195). In addition, a report conducted by Umalusi Quality Council Report (2012, p. 212) stresses the need for "lecturers to do more practical on topics covered to enhance the conceptual

understanding by students" in an attempt to link "know" and "do". Therefore, with subject guidelines silent on the practical structure (practical syllabus), CBMT approach may provide solutions as it promotes the accreditation of workshops and continuous professional development of lecturers to adapt them to the training modules. Furthermore, the CBMT supports students to obtain a practical certificate reflecting modules completed as evidence to show the prospective employer when seeking employment.

In line with the above, there is seemingly a need to conduct a study on the adoption and adapting of the CBMT system to the OBE for NCV engineering programmes (proposition). However, there is also a need for the lectures teaching ES&C NQF L4 to reflect critically on how the practical training value can be improved to open gates for students' employment opportunities by prospective employers which may ultimately bring hope to South African youth and society at large**.** In line with the above, it is documented that OBE as an approach to learning via curriculum, carries content knowledge and ideological information to be transmitted to students (Apple, 2003; Lolwane, 2001; SAQA Qualification ID50441, 2006). Therefore, it is essential for this study to present dominant ideologies affecting curriculum in order to identify their roles in the attainment of ideal learning outcomes.

2.8 Dominant ideologies affecting TVET College curriculum

This sub-section seeks to define ideology in the context of education and curriculum, highlight the power factor role in pushing ideology as a social control tool, identify dominant ideologies influencing our curriculum especially the TVET Colleges and lastly explore the pros and cons of such ideologies.

According to Schiro (2013a, pp. 7-8), curriculum ideology can be defined as "curriculum vision, philosophies, doctrines, opinions, conceptual frameworks and belief systems of education". Furthermore, (Schiro, 2013) added that dogma is a compilation of mind-sets, all-inclusive vision, a world view that represents the way a group of people believe the universe should be co-ordinated and function. Similarly, Giroux (1988) defines ideology as a set of dogmas and the conduit through which lecturers/trainers/instructors make sense of their know-hows and those of the universe which they occupy. The two mentioned academics base their input from the content perspective which is the domain of academics. Furthermore, both scholars share common views that ideology should include doctrines and worldviews, which may imply that lecturers should consider policies, curriculum vision/rationale and broader goals meant to be achieved by taking cognisant of International (Supra), National character and

identity including the National dynamics (Macro). Conceptual framework/learning signals (Khoza, 2015;Van Akker, 2009) which guides this study, is a domain of the lecturers at micro-level. Therefore, to achieve the attainment of the curriculum enactment/teaching set goals, lecturers should be pedagogical and technological competent (Koehler & Mishra, 2009). However, beliefs demand to be critically scrutinised and challenged if need be. Therefore, lecturers' reflection is essential to ensure there is synergy between planned/official/documented curriculum; enacted/implemented, and the assessed/achieved curriculum to be able to improve students throughput.

Moreover, there must be an acknowledgement and recognition that power, knowledge, ideology, and schooling are linked in a continually dynamic environment (Giroux, 1988). In the South African context, this implies that there are numerous stakeholders who are interested in influencing the curriculum content, namely the business community, social partners and Government agencies. However, the financiers sponsor material capital (economic related critical skills) to enhance production and social responsibility initiatives. Thus, because of their financial power, they decide on what information should be incorporated in the curriculum framework. Furthermore, social partners push for a social justice agenda to reduce un-employment and equity imbalance. Moreover, the Government being the main sponsor and custodians of TVET College system pushes for more of its programmes to dominate, even though they at times lack relevance and currency. The Government is political mandated to provide guidance on issues of economy, socially and political stability. Therefore, Government uses its power to influence the curriculum content, vision and ideologies to achieve broader goals and the National character (defines who we are guided by broader vision and culture). Therefore, lecturers' reflection is critical at ensuring there is smooth interface and synergy between the TVET College mandate as positioned by the NCV Policy and other documents, and the curriculum goals at Micro-level. Therefore, it is crucial for the study to present dominant ideologies affecting TVET College curriculum.

In line with the above, studies have revealed that developmental countries align their technical education goals to support economic growth and employment, and this approach is regarded as neo-liberal ideology (Akoojee., 2016; McGrath, 2000; Rasool. & Mahembe, 2014; Venupal, 2015). In the South African circumstances, the role of TVET College in the developmental state is to address the triple challenge (poverty, in-equality and un-employment) based on the neo-liberal context on the assumption that training results in productivity, which in turn leads to economic growth while skills lead to employability. Neo-liberalism philosophy can be

successful and effective only if there is commitment, dedication from students, economic stability, lecturers and trainers. The education system in South Africa is expected to give direction to society, provide guidance to the type of culture (National character and identity) best suitable for the nation and influence individual students to realise their potential and capabilities through personal development in order for the students to contribute in the economic growth of the nation. Therefore, the student-centred ideology may contribute meaningfully to moulding the character of the student when applied appropriately.

2.8.1 Student-centred ideology

Student-centred ideology promotes personal development of the individual student and push for the recognition of skills the student brings to the learning settings and thus calls for lecturers to further facilitate the development of the student (Hoadley & Jansen, 2013; Schiro, 2013a). According to Schiro (2013b, p. 9) ”learning is a function of the inter-action between a student and his/her ecosystem” furthermore, the lecturer/trainer is to create context and an environment which stimulates growth as students construct meaning for themselves. Hoadley and Jansen (2013) and Schiro (2013b) concur that this approach gives privilege to the outcomes and hides the content for the individual to explore. Moreover, student-centred approach is focused on what a student can do at the end, excluding what is missing. Means towards the end is not considered and students research the content to address the subject and learning outcomes. In the context of ES&C NQFL4, which is practically inclined, outcomes are dependent on the availability of learning and training resources plus the availability of the e-learning support system, prescribed books and both the learning and training material to give direction. Furthermore, practical content requires the lecturer to lead rather than be a shadow. Practical training and projects done in the Electrical engineering field demand that a lecturer leads to demonstrate the activities (skills) first as opposed to theory (knowledge) where they only explains. Thereafter students practice while the lecturer/instructor observe, and intervene where necessary. Therefore, the success of the training approach for dual-content requires highly disciplined students operating within a conducive and resourceful environment. In addition to the above, skills development promotes individual participation and the mastery of concepts or skills being learned which may lead to quality societal proficiency. In line with the above, it may be important to discuss the social efficiency ideology and its impact on education and training.

2.8.2 Social efficiency ideology

According to Schiro (2013a), social efficiency (promotes hard working students for today and in future) advocates that a TVET College is effectively facing the needs of society by training youth to function as future mature participating members of society. Therefore, the target is to train youth in the skills and procedures they will require in the workplace, and household to live productive lives and contribute to the functioning society socially and economically. Further to this, the social efficiency ideology (those who drive the social efficiency) regards efficiency, skills, and competences as key components to position the student for employability opportunities. Furthermore, education and training guided by terminal objectives of the curriculum, youth achievements should empower students to perform the necessary functions for social productivity which may include the inculcation of industrial habits, commitment, time consciousness and productivity.

In the South African context, the work floor space competition for employment is heavily contested by not only South African citizens but the global community (an example is the Madupi power station construction labour crisis in 2008) who bring in acceptable work habits, skills and labour culture from their mother countries. Therefore, TVET Colleges have a huge responsibility to thoroughly prepare the youth academically, technically, and socially in order to create a level field for them to compete. While the social efficiency agenda could be a huge boost to students' morale, the main concerns are the practical capability of TVET College to deliver quality training. Physical resources, time, and competent technical trainers are key factors in addressing the social efficiency vision. Critical reflections from the ES&C NQF L4 lectures, their role to support social efficiency agenda is essential. Furthermore, lecturers' reflections may assist at finding solutions why TVET College students employment rate is low. Further to this, there is a need to acknowledge that students' employability depends on their practical capability and proficiency. However, social efficiency (a theoretical tool which promotes practical excellence) seeks to create hope in students for future participation in the economy. The NCV Policy 2006, mandates TVET Colleges to produce students with skills to create employment opportunities and also after completing NQF L4, to articulate to higher educational institutions. However, to articulate to higher learning is about academic excellence and therefore, this takes us to the scholar academic ideology.

2.8.3 Academic Discipline ideology

According to Schiro (2013a), an academic discipline (the scholar academic ideology is located within academic discipline) is viewed as a hierarchical community of people in search of truth

within one part of the universe of knowledge. Schiro (2013a) further asserts that the hierarchical communities consist of inquirers to the truth, scholars at the top of the hierarchy, teachers (lectures) of the truth, those who disseminate the truth that has been discovered by scholars and the learners of the truth, students whose job is to learn the truth so that they can become members of the discipline. This ideology ensures that students develop a discipline-specific thinking ability and therefore reflect discipline they specialise in (Cotti & Schiro, 2004; Schiro, 2008). In the South African context, the assumption is that education is for access to higher specialised knowledge (Hoadley. & Jansen, 2013) and for National Certificate: Vocational L4 this thinking is positioned by DoE Minister Pandor (2006) however the articulation seems to be facing cul-de-sac challenges. In line with the above, there is a need for a study focusing on what frustrates the articulation of NCV engineering students to higher educational institutions. The curriculum and educational ideologies topics cannot be concluded without exploring the social reconstruction ideology considering that in South Africa, the majority Blacks community were terrorised by colonial system and further brutalised by Apartheid system for more than a century (Mandela, 2013) (Taken from line 3 of the In auguration speech published in 2013).

2.8.4 Social Reconstruction ideology

According to Schiro (2013a), social constructivists' philosophers are conscious of the societal problem and injustices done to its members. The injustices noted are racial, gender, social and economic inequalities. In line with this, they view education as a tool to facilitate the construction of a new just society. Furthermore, social reconstructionist have faith in the vision of better society and the implement of such vision.

In the South African context, the social reconstruction ideology advocates for education to promote social justice where the curriculum content must equip students with knowledge, skills and values necessary for self-fulfilment and meaningful participation in society as a citizen of a free country irrespective of their socio-economic status, race or gender (SAQA: ID 50441). The ultimate goal is to address the triple challenge of poverty, unemployment and inequality through education and training. While social reconstruction ideology may add value at normalising racial animosity and find solutions to the triple challenges, ideologies are always associated with the social control mechanism of which people are very sceptical. In conclusion, history has taught us that ideologies will always be used to influence education and curriculum. In line with this, (Zeichner & Liston, 1996) contend that lecturers should always be open-

minded and be aware of the believers namely the vulgar, sophisticated and critical believers and furthermore lecturers should be critical about these ideologies and therefore should reflect on these ideologies to ensure they make sense to them and where necessary management must further empower lecturers and trainers with more knowledge about the relevance of these ideologies in order for lecturers to understand them and be able to apply them effectively to develop the spirit of patriotism accountability and uBuntu among students. However ideological information and curriculum content transmission to students is dependent on curriculum models, and approach adopted for delivery purposes, and therefore the next topic will present the curriculum models.

2.9 Curriculum models and their comparison

Studies reveal that curriculum discourse is categorised into vertical and horizontal models (Bernstein, 1999; Bertram, 2010; Hoadley. & Jansen, 2013). Furthermore, the selection of the approach is mainly influenced by the lecturers personal, societal, or professionals vision (Khoza, 2016). In line with the above, conditions and circumstances in the education and training dynamics may compel the lecturer/instructor/facilitator to integrate both the vertical and horizontal approaches as balancing needs of teaching arise resulting in a hybrid approach namely vertical-cum-horizontal approach. In addition to the above, curriculum definition, levels and presentations are already discussed on section 2.4, page 26 therefore, this sub-section will present the views of scholars on comparison of the models, history of curriculum, horizontal, vertical curriculum models and their merits and demerits.

Hoadley. and Jansen (2013), contend that the difference amongst performance/vertical and the competence/horizontal is outlined by students' domination over curriculum as they interrogate knowledge for self-empowerment to make sense of knowledge. The role of lecturer towards the implementation of the curriculum is influenced by academic knowledge and subject command expertise, lecturing style, knowledge (every day or school), activity which may be content or student-centred, resources, assessment, learning space (face-to-face or unstructured place). However educational goals may either be objective-based or outcomes-based in these two curriculum models. Furthermore, these curricula discourses reflect the socio-educational ideologies and politics from influential stakeholders (Apple, 2003; Jansen, 1990; Kehdinga, 2014), therefore, the next paragraph presents the history of education elsewhere and in South Africa.

Studies reveal that education for Black Africans has been a responsibility of missionaries and dates back as early as the 19th century. Furthermore, this educational curriculum was not part of Western education (societal/horizontal) (Ezeani & Urama, 2014 ; Hoadley. & Jansen, 2013; Jansen, 1990; Khoza, 2015b). The history of education in South Africa according to Hoadley. and Jansen (2013); and Jansen (1990), dates back to 1658 when the first school was formed based on racial and class systems. Slaves and Khoisan were taught local knowledge (Non-Europeans were taught skills to serve their masters) and Europeans/Whites taught international knowledge (European oriented education) and the curriculum was based on Christian religion. Hoadley. and Jansen (2013) further assert that prior to 1910, formation of the Union of South Africa and the industrial revolution, new school system was formed along racial lines where the education of Europeans became the responsibility of the state (provinces/colonies) and the church became responsible for Non-Europeans with different curriculum for example in Natal, schools were under different church denominations and this included St Frances College located at Maranhill, Adams College (Amanzimtoti), Inanda Seminary, Ohlange Institute to name a few.

In the context of technical education, vocational schools were formed during the tenure of the Apartheid regime in all four provinces to support industrialisation mainly the mining and agriculture. Curriculum was based mainly on theory and skills for Non Europeans (horizontal/local knowledge) (for societal reasons) and for Europeans, the National Technical Education (NATED N1-N6) instructional offering (for professional reasons) which had the following learning areas: Applied Mathematics; Applied Science; Technical Drawing and Trade Theory (vertical curriculum) which was a dual programme with strong industrial practical exposure involving ten weeks institutional education at a college and nine months at the workplace on yearly bases until the student was ready to undergo trade-test in their chosen career. Furthermore, for Blacks, the NATED (N1-N6) was first offered in 1977 a year after the Soweto uprising.

In the same line of thinking, Khoza (2015b) reveals that during Apartheid, the Christian National Education (CNE) philosophy drove the curriculum and its principles put more emphasis on rote learning. However, Khoza (2015b) opines that curriculum 2005 (competence curriculum) was introduced from 1998 to 2012 in all schools and later replaced by CAPS (performance curriculum) in 2012. Further to this, in 2007 the National Certificate: Vocation (NCV) was introduced in South Africa in all 50 Further Education and Training (FET) Colleges

now renamed (TVET), where the delivery approach became OBE (biased towards outcomes). By the same token, it was noted that the driving approach (OBE) supports the idea of the curriculum theorist Freire's (1985) approach to curriculum enactment which Bernstein (1999) and Bertram (2012) regarded as competence discourse curriculum. Moreover, technical education and training being dual-content, had the mandate to develop students theoretical knowledge (academically/professionally) and these theories led to national summative assessment and furthermore, the practical skills, values/attitudes, and competences also had a structured training programme leading to national practical assessment conducted at Central Trade Test Centre (COTT), now called INDLELA situated at Olifantsfontein for an individual student to do trade-tests in their chosen trade for self-development for economic participation. The trade assessment centre (COTT) was centralised nationally and later (post democratic South Africa era) decentralised for convenience (accessibility to students), and economic reasons for trainees wanting to be trade tested.

The dual-content mentioned above leads to two qualifications being a trade qualification through acquiring practical competences in a structured training environment and being trade tested then getting certificated (societal). Furthermore, the theoretical certificate which is achieved when the student is found meeting the examination requirements as they write N-national examinations. The TVET education system in South Africa places students at the centre of learning (constructivism) which assists students to make sense of knowledge for personal development to meet the industrial expectations. In the context of the above, the next paragraph seeks to explore the horizontal/societal curriculum.

2.9.1 Horizontal/Integrated Discourse and the features of the curriculum

In the horizontal curriculum, the learning driving approach is OBE which is student-centred, and activity biased where lstudents are in control of the learning content and learning speed (Bernstein, 1999**;** Bertram, 2010). Hoadley. and Jansen (2013) assert that the pedagogy is personalised and process oriented, and that the role of a lecturer is a facilitator or guidance provider. Khoza (2016) and Hoadley. and Jansen (2013) posit that knowledge is understood as every day or common sense knowledge which tends to be oral, local, context dependent, and a specific, tacit and multi-layered discourse. Bernstein (1999); Bertram (2010) and Hoadley. and Jansen (2013) assert that knowledge is segmental differentiated with integration between subjects segmentally organised. Hoadley. and Jansen (2013) and Bernstein (1999) maintain that detailed information on the subject-content is not important and left entirely to the lecturer

to interpret the curriculum and source relevant information for effective learning. Further to this, learning results are outcome driven where learning is not dependent on a formal learning site but can happen anywhere, even at home. Furthermore assessment is mostly about what the students have attained (outcomes) not what the students should have accomplished based on universal canons given that the prescribed knowledge is restricted (Cavus, Uzunboylu, & Ibrahim, 2007; Khoza, 2016). However, the above suggests that the competence curriculum discourse is more focused on the student, the lecturer, the pedagogic approach, knowledge (procedural knowledge), assessment and learning sites.

Furthermore, Khoza (2016) posits that in the competence curriculum, subjects are merged to form a learning area. In the South African context, NCV which is a competence/horizontal curriculum, is driven by specified outcomes that are divided into seven critical outcomes (CO) and five developmental and learning outcomes (DO) (SAQA Qualification ID50441, 2006). Khoza. (2013b) and Hoadley. and Jansen (2013) concur that accomplishment of visible and quantifiable outcomes is the foremost practice in the horizontal discourse.

Additional to the above, the Skills Development trajectory in South Africa post millennium (2000), presented the National Certificate (Occupation directed) qualification. This qualification included artisans development (legacy programmes) and learnerships which is an integrated unit standards driven programme. This new skills development landscape was supported by the Skills Development Act (1998) and other critical legislative frameworks for implementation purposes. For the first time in the South African technical education and training history, learnership integrated qualifications composed of fundamentals (Communication English, Mathematics and Life Orientation), core and elective unit standards was introduced (Badroodien & Simon McGrath, 2005; DoL, 2001)

Furthermore, qualifications are credit based and the learner must complete all required unit standards including, workplace time exposure as per the prererquisites of the Education and Training Quality Assurance (ETQA) responsible for the qualification certification (SAQA ID 72052). The approach to learning and training is OBE, but the emphasis is more on the trainees' capability to integrate theory and practical learned which happens in a well-resourced workshop taught by an accredited and ETQA registered instructors.

Studies reveal that OBE in a horizontal curriculum, gives learners the privilege to pace themselves as they explore knowledge. Furthermore, in a dual-content, students can explore theory knowledge but for practical's the instructor's continuous guidance as they facilitates is

crucial. Furthermore, the horizontal curriculum promotes learners' confidence especially if resources are available and students being taught by motivated lecturers/instructors. However, the Electrical Systems and Construction (ES&C) NQF L4 which is the nucleus for this investigation project is an elective subject within the Electrical Infrastructure Construction (EIC) NQF L4 and unlike the National Certificate: Occupational, this subject is vocational discipline with dual-content which is theory and practical. Furthermore, ES&C NQF L4 falls under competence discourse. The EIC NQF L4 is positioned by NCV Policy to promote students articulation in both the world of work and higher educational institutions (HEI) and currently, students are experiencing a cual-de-sac to HEI (MTT Final Report, 2013). In line with the above, the next paragraph intends to investigate the merits and demerits of the integrated/horizontal curriculum.

2.9.2 Strengths and Weaknesses of the competence discourse

The primary driver of learning are the activities of students/trainers, their minds and expertise attained through participatory and active learning which is likely to be remembered compared to knowledge presented verbally. Furthermore, knowledge obtained in a recognisable, appropriate problem-solving background is better grasped and assimilated. However, there may be severe downsides for duel-content (combined theory and practical for integrated learning). The practical component needs the lecturer to lead by showing how the practical activity is done before students can proceed with activities. Furthermore, other activities require that the lecturer should be present especially where safety aspects and precision are crucial, for example using the pedestal drilling machine. Moreover, for the learner-centred approach (involving practical activities), the lecturer must teach and facilitate to eliminate chances of unsafe acts occurring. The implementation success of OBE- driven programes especially engineering, may be hindered by the scarcity of resource namely: time, human, technological and material (Hoadley. & Jansen, 2013).

Over and above, there is a need for lecturers' reflections of their curriculum practice of the teaching of ES&C NQF L4, which is dual-content to guarantee the intended learning outcomes are attained.

2.10 Vertical/performance Discourse

Carl. (2002, p. 55) asserts that "performance/vertical discourse is directed by academic rationality and theoretical logic". Moreover, according to Carl, (2002), the academic approach

is goal and objective-centred and the learning space is dominated by the lecturer. In addition to that Bernstein (1999) and Bertram (2012) concur with Schiro (2013a) that academic discipline/vertical/performance is based on official knowledge and benchmarked against international canons. To note, vertical discourse and academic disciplines have the same features and belong to the academic/vertical/performance academic family.

2.10.1 Features of the Collection/Performance discourse

This model puts the lecturer at the centre to direct the teaching role, as opposed to the horizontal discourse, students have no control over what is to be learned, the sequence and pacing (Hoadley. & Jansen, 2013). Furthermore, Hoadley. and Jansen (2013); Khoza (2016) and Bernstein (1999) concur that in the vertical curriculum discourses, subjects within the discipline are demarcated with an emphasis on school knowledge as opposed to everyday knowledge and experience. In addition to that Bernstein (1999) asserts that the curriculum is specific about learning content and its order. Furthermore, knowledge acquired is built vertically and becomes complex as it moves up the levels. Moreover, Hoadley. and Jansen (2013); Bernstein (1999) and Schiro (2013a) insist that a subject stands on its own and the compilation of its terminology and concepts are established. In addition to the above, the assessment of learning may be what the students have learned but the emphasis in performance curriculum is on what is cognitively missing, taking into account that students should learn from basic knowledge to the upper knowledge levels (Budden, 2017; Khoza, 2016).

In line with the above, a reasonable subjects' comparison in support of Hoadley. and Jansen (2013) is the Electrical Infrastructure Construction NQF L4 subjects namely: Electronic Control and Digital electronics and the Electrical Systems and Construction (core subjects) which are strongly classified with own terminology and language when compared to Life Orientation. The latter subject is weakly classified lacking own terminology compared to the core. Also to be noted is that learning takes place at a structured environment controlled by the lecturer. For instance, learning space could be classroom, laboratory, simulation room, or workshop settings. In addition, the quality of content in terms of breadth and depth is highly regarded and time framed. However, Hoadley. and Jansen (2013) assert that, access and exit to levels is strictly controlled by external examination which is managed and controlled by the lecturer where some criteria of what is right or wrong determines pass or fail. For ES&C NQF L4 (competence model) the criteria uses a scale of achievement with a rating from 1-5 for core subjects where 1=0-39% not achieved; 2=40-49% not yet achieved; 3=50-69% competent;

4=70-79% highly competent and lastly 5=80-100% outstanding. This rating is applicable to theory (ICASS) and ISAT.

While performance curriculum seems to promote pure and stand-alone subject knowledge, for vocational education and training, theoretical knowledge are integrated with practical's to produce practically capable student regardless of the curriculum models chosen. In line with the above, van Manen. (2007, p. 22) in relation to theoretical and practical knowledge, remarked that we may "discover what we know in how we act in what we can do". Furthermore, van Manen. (2007, p. 20) maintains that practice includes a diverse way of knowing the world hence theory "thinks" the world while practical "grabs" the world. My observation is that the academic rationality community is strongly linked to cognitive domain and appear less concerned about psychomotor domain yet ES&C NQF L4 theory is a dual-content thus this may have huge implications in the final product from a capability quality product perspective.

May be this is an opportunity for a study to be conducted to explore the integration of both domains. This integration may help to address tension between theory (cognitive domain) and practical (psychomotor domain) for effective curriculum delivery of ES&C NQF L4 curriculum and the attainment of positive results. Additionally, Hoadley. and Jansen (2013) aver that curriculum interpretations between the intended and the implemented/enactment desire attention therefore the next paragraph seeks to explore the interpretation concerns.

2.11 Curriculum interpretation concerns

Concerns have been raised by Bertram (2012); Bernstein (1999) and Hoadley. and Jansen (2013) as to how faithfully the official curriculum message is interpreted, implemented, and evaluated. This concern is more serious when considering the quality and the experience of TVET College lecturers at Micro-level especially the NCV programmes which is dual-content namely the theory and practical. Vertical and horizontal collegial relationship and lecturers' reflections on the interpretations of the intended and practiced curriculum may be important to attain desired results for individual student and society at large.

2.12 Literature review chapter concluding statement

The literature review presents the academic work of the African continent scholars, European Union and Asia origin academics. The literature review framework has been used to frame topics befitting the research project especially the phenomenon which focused on the lecturers' reflections in their practices of the teaching of ES&C NQF L4 NCV curriculum. Scholars

present reflection types applicable in the lecturing environment and beyond. Moreover, Maxwell (2013); Taylor (2004); Smyth., McInerney, Hattam, and Lawson (1999) and van Manen (1977a) concur that reflection is divided into three major levels namely: Technical reflection (professional dimension- for professional application of educational knowledge); Practical reflection (societal dimension- application of guiding principles to achieve educational goal for example the set outcomes), and lastly the critical reflection (personal dimension –social, moral and college politics). Furthermore, (Khoza., 2013b) maintains that reflection awareness is important at minimising the existing gaps between theory and practice. Moreover, Impedovo. and Malik (2016) added that the analysis of success and failures is critical and therefore, lecturers should continuously re-evaluate themselves to enhance their teaching practice. In support of the above line of thinking, (Çimer., Çimer, & Vekli, 2013) added that critical reflection takes no defensive stance but remains aware and concerned with moral and ethical matters involving didactic processes. Details provided on pages 48 on section 2.2. Furthermore, the literature also presents the socio-economic vision impact on TVET College programmes which intends to emphasise that the TVET College mandate is societal, ideological and political (Carl., 2002; Falkenberg., 2013; Hoadley. & Jansen, 2013; Kehding, 2014; Pinar, 2012; Schiro, 2013a). Moreover, the scholars highlight the challenges related to curriculum delivery of the dual-content ,where lack of practical structure is perceived to be a challenge to the improvement of students' competences, proficiencies, values, and attitudes.

No study was conducted to explore the impact of dual-content delivery tension caused by the silmateious application of two different curriculum models when teaching the theory and practical. Therefore, a need for a study to explore a possibility of the integration of both the competence and performance approaches into competence-cum- performance approach in order to balance both needs to dispel tensions is essential. Furthermore, where resources are scarce (practical's), the instructor may use Rotational Method through grouping students purposefully to perform a task that is different to what others are doing but once they have finished, students move to the next different task or rather wait for the next group. This method put more pressure on the instructor's trade, content-knowledge, and experience.

The above discussions imply that lectures should critically reflect on students, teaching methodology (ideological-ware), dual-content knowledge, assessment, teaching space and resources. Furthermore, should self-reflect on their teaching practice of the ES&C NQF L4.

In addition to the above, the success of any curriculum enactment/implementation whether competence or performance is dependent on a number of curriculum components. Therefore, the next chapter will focus on the ten learning signals/curricular spider-web concepts (Khoza, 2015c; Van den Akker et al., 2009) which will be used as the conceptual framework that puts the study into action.

CHAPTER 3

CURRICULUM CONCEPTUAL FRAMEWORK

3.1 Introduction

Christiansen et al. (2010) contend that a conceptual framework is created from established opinions aimed to give direction, structure and spotlight of the study. Similarly, Silverman (2013)) concedes that a conceptual framework provides an inclusive background for observing truth that enlightens the views used to define our study problem.

In line with the above, Khoza (2015c) posits that curriculum implementation has been driven by different ideological-ware (IW) resources but for effective implementation, the "learning signals conceptual framework is a preferred framework in framing the implementation of the curriculum" (p104). Moreover, there are propositions per concept that indicate how and why lecturers are teaching ES&C NQF L4 NCV curriculum.

The ten curricular spider-web/learning signals concepts is grounded on the academic work and vision of Van den Akker et al. (2009) and the contribution of Khoza (2015c) on learning signals. These concepts position the practice curriculum at Micro-level. The location of curriculum concepts are centred on the vision (rationale) which forms the heart of the curriculum implementation. Furthermore, the "vision connects all component to each other providing consistency and coherence" (Berkvens. et al. (2014, p. 12). In addition, Berkvens. et al. (2014) contend that the image of the spider- web,highlights the vulnerable character of curriculum whereby the web may rupture if other strands are pulled more strongly than others. In the context of ES&C NQF L4 (OBE) curriculum implementation, if the lecturer, goals, resources, content, are problematic, the attained curriculum may produce negative outcomes. In addition to the above, the ten curriculum concepts as framed by the literature, may be easily understood when presented in question format and these are questions:

What is the reason for teaching? (Rationale); Which goals does your reflection intend to achieve? (Targets; objectives and outcomes); What are you teaching? (content); What activities are used to teach ES&C NQF L4 dual-content? (Teaching activities); Explain the resources used to teach ES&C NQF L4 (resources); How are they facilitating instructions? (Teacher roles); How is admission to teaching and learning (Physical; Financial and Cultural); Which training and teaching space is used? (Learning environment/workshop); At what time is teaching done? (Time); How are students evaluated? (Assessment)

Therefore, this research project may afford lecturers the chance to deliberate on how they enact/implement ES&C NQF L4 OBE curriculum at a TVET College.

3.2 Vision and goals for Electrical Systems and Construction NQF L4 lecturer

Curriculum theorists including Berkvens. et al. (2014), Khoza (2015c) and Hoadley. and Jansen (2013) concur that the deficiency of curriculum teaching vision and goals in educational arena has been identified as a dominant recipe for poor teaching and learning distressing local (Macro) and international (Supra) communities. Therefore, this tendency requires critical attention to foster critical thinking, an acceptable and conducive educational environment. Khoza (2016) maintains that this is a continuing practice by the lecturers which when addressed, can improve their teaching practice.

Curriculum whether as intended/documented, practiced or attained is driven by vision and goals. Therefore, it is crucial for the curriculum implementers to know the curriculum vision, goals, and the underpinning principles. In line with the above, Berkvens. et al. (2014) assert that shared vision is a major ingredient for successful education reform and curriculum implementation. Moreover, Berkvens. et al. (2014) maintain that the vision can be pedagogical (personal talent and character development), societal preparation for citizenship and social skills development or a professional vision. On the basis of the above discussions where more emphasis is put on vision, there is a need to know the description of a vision from the scholars' perspective. According to the Concise Oxford Dictionary 8th edition, vision is an idea perceived vividly in the imagination or imaginative insight, while Khoza (2016) perceives vision as a cognitive process guided by the conscious–mind. On the same token, Du Preez & Ready (2014) assert that lecturers should avoid to use sub-conscious thoughts meaning habits without or limited thinking or awareness. Therefore, scholars (Du Preez & Reddy, 2014.; Khoza, 2016) advise that we abstain from operating on sub-conscious and habitual mode so that unorthodox probabilities can be realised. The following paragraph therefore focus on DHET vision as an employer and custodian of Post School Education and Training system in South Africa thereafter, explore curriculum visions as positioned by Khoza (2016).

In South Africa, TVET College sector, being focused on national competence is located in the PSET sector managed by the DHET. Furthermore, Rasool. and Mahembe (2014) concur with the White Paper PSET (2013) that PSET aligns the imperatives of the post-school education and training system to the inclusive goals of the Government's national developmental agenda. This gesture is aimed at aligning the TVET College sector to the national policy discourse and

ensuring that colleges make a meaningful contribution to addressing the developmental needs of the state. This thinking is in line with the National Development Plan 2030 vision of an education system that will play a greater role in the reconstruction of the country to address all social injustices of the past (National Planning Commission, 2012). On the basis of the above, the DHET vision is to create a leading Post-School Education and Training for growth (DHET Senior Management, 2016). Moreover, the DHET Minister is mandated to outcome 5 of the 14 Government Performance outcomes which is: A skilled and capable workforce to support an inclusive growth path (Republic of South Africa MTSF 2014-2019, 2013). This proposition concurs with human capital and human capability approaches (Rasool. & Mahembe, 2014; Tikley, 2013). The next paragraph presents the curriculum vision as proposed by Berkvens. et al. (2014) and Khoza (2016).

The curriculum or instructing vision is divided into critical/personal, communicative/societal and technical/professional/instrumental visions. Furthermore, professional vision is the pivotal concept that commands all other curriculum concepts (Berkvens. et al., 2014). However, the fourth vision is identified as the reconstruction vision (Khoza, 2016; Schiro, 2013a).

The success of the implemented and received curriculum if all other support systems are in order, is dependent on the lecturer and the student thus personal vision is centred on individualism (Kehdinga, 2014; Khoza, 2016). Lecturers make personal decisions and commitments to develop themselves in a particular profession in order to shape their future careers fortheir own benefits and hopefully their families. Khoza (2016) postulates that the teaching vision generates an atmosphere that assists lecturers and students to create their own distinctive individual characters. Furthermore, Schiro (2013a) asserts that personal meanings make up know-how that is exclusive to each individual that owns it. By the same token, it is critical for individual lecturer to make introspection on pedagogic content knowledge mastery in order to have confidence in their teaching practice. Therefore, the assertion from scholars (Khoza, 2016; Kedhinga; 2014; Schiro, 2013) implies that the strength of the nation and moral fibre begins with the individual person and spread to the entire society.

According to Khoza (2016), societal vision privileges the society to dominate the teaching and learning space. This vision becomes student-centred and makes the lecturer to disappear from the centre stage. Bernstein (1999) and Hoadley. and Jansen (2013) regard this learning environment as competence/horizontal or integrated curriculum which is outcome driven where outcome statements concentrate upon outputs rather than the inputs of teaching

(Marsh1997) and are founded on local every day and common sense knowledge as opposed to school knowledge. Furthermore, the social re-engineering agenda (social justice) messages compete with the human re-engineering agenda (visible but no specified content (Hoadley. & Jansen, 2013) for a space in the curriculum. Bernstein (1999) questions how faithfully the official curriculum message is interpreted and implemented. This question further raises concern about lecturers' preparedness and readiness to drive the practiced curriculum via OBE approach which is characterised by underpinning principles, seven critical outcomes and five developmental and learning outcomes. In the context of ES&C NQF L4 NCV curriculum, the content is both theoretical and practical (dual-content), assessed separately both formative and summative. In addition, relevant physical, and human resources must be accessible for effective and productive learning and training. The accomplishment of measurable/recognisable outcomes is the main practice in this type of vision (Khoza, 2016; Khoza., 2013b).

Furthermore, Khoza (2016) & Khoza (2015b) attest that assessment is about what the student have achieved not what was intended to be achieved based on international standards. While the above statement holds water, for ES&C NQF L4 which is made of six highly technical topics, (renewable energy technologies; power generation; transmission (extra-high tension); and distribution plus fault findings), these topics demand content mastery. Furthermore, technical education and training is meant for local application (diverse industry) regardless of the sophistication of practitioner's development. For example the practicing field is manned by engineers,' technologists, technicians, and craftsmen but what is common is that their field knowledge and skills are universally applicable (low to very high knowledge and skills). Observations made on the NCV is that, the practical is taught from the theory approach as was reported in the Ministerial Task Team Report (2013) and furthermore the subject guidelines do not have a structured content for practical activities to be covered let alone standards to be adhered to. We have observed the worshiping of the cognitive domain at the exclusion of the psychomotor domain yet practical component is supposed to be 60% of the programme (NCV Subject Guidelines, 2015) . This has led to the production of practically dysfunctional students yet theoretically knowledgeable. For effective and productive learning, teaching and training, a hybrid of performance-competence curriculum model will be appropriate especially when considering the practical training where the instructor's knowledge and experience is crucial for skills transfer. Practical proficiency teaches students to answer the what question but theory

teaches them to answer the what question. Therefore, the next paragraph presents the professional/academic vision.

According to Khoza (2016), professional/vertical reflections put discipline at the hub of the teaching and learning platform. Curriculum theorists namely Bernstein (1999) and Bertram (2012) concur that this teaching approach is called vertical, collection, or performance curriculum and moreover agree that this is a terrain where the cognitive domain dominates the learning platform. Subject content knowledge, pedagogical, and technological knowledge are key components for the success of the curriculum delivery by the lecturers. Studies reveal that in the cognitive domain, the goal focus is based on objectives. Furthermore, the content is based on literature while activities are content-centred/teacher-centred. Moreover, learning/teaching takes place in a structured environment where the face-to-face approach takes place. Furthermore, in the performance curriculum each subject stands on its own and has a collection of terms and concepts (Bernstein, 1999; Bertram, 2012; Hoadley. & Jansen, 2013; Khoza & Mpungose, 2017). Lecturers who teach ES&C NQF L4 are expected to present their professional visions of this curriculum. A national study conducted by the National Business Initiative (NBI) of lecturers across a range of fields discovered that an approximation of half the lecturers assigned to teach NCV had no industrial experience and no lecturers' development plan had been put in place to close the capacity gap (Gewer., 2016). In line with the above, at the FET College Summit held in 2011, the South Africa College Principals Organisation (SACPO) raised concerns on NCV lecturers' lack of development especially in content knowledge, curriculum matters and methodology (MTT Final Report, 2013). Furthermore, Wedekind, Watson, and Buthelezi (2016, p. 136); MTT Final Report (2013) plus Chukwudi and Chukwidi (2015) concur that relevant TVET lecturer qualification are essential for the sector to yield acceptable attained curriculum outcomes. In support of the views of the above mentioned scholars, Gamble (2013) recommended the following competences for the TVET College lecturers and they are: formal subject or technical knowledge, pedagogic expertise, and practical workplace experience. Furthermore, Schimdt (2012); Ndwandwe and Dlamini (2013) also emphasised that the lecturers should be adequately qualified to teach specific skills and content to students to the satisfaction of the qualification requirements as positioned by subject aims and objectives. In South Africa, being a developmental state, there is a huge need for competent professionals to technically support the New Growth Path strategy. Moreover, TVET College lecturers are employed to assist in the accomplishment of the DHET Minister's mandate to produce: " A skilled and capable workforce to support an inclusive growth path" (Republic of South Africa MTSF 2014-2019, 2013).

In line with the above, the professional vision and the skills production processes are associated with the availability of relevant and qualified curriculum practitioners, which is a scarce commodity in the TVET College sector influenced mainly by the lack of relevant TVET College tailor-made teacher development qualifications. For successful implementation of ES&C NQF L4 NCV curriculum, which is dual-content subject, the lecturer is recommended to have the following competences: the technical experience, content knowledge, pedagogic knowledge, technological knowledge (Koehler. & Mishra, 2009). South Africa being a democratic and developmental state, is prioritising social reconstruction and development in its its NDP agenda to create social cohesion and harmony. Therefore, the reconstruction agenda cannot be completed without the reconstruction vision (National Planning Commission, 2012).

Social reconstruction vision is a philosophy that sensitise the society to be conscious about the impact of the past social injustices, furthermore, this vision promotes participation and cooperation in the nation rebuilding strategies to create harmony, social cohesion, and peace amongst South African society. Various scholars have made their contributions in this discussions.

In South African context, reconstruction vision can be viewed as an integration of social reconstruction practices to support social reconstruction agenda (Khoza, 2016; Khoza & Manik, 2015; Schiro, 2013a). According to , By the same token, TVET Colledge lecturers apply their persona,l interpretation of the world in pursuit making meaning to knowledge reconstruction considering self-awareness professional practices avoiding habits and unverified beliefs and assumptions (Dewey., 1933; Khoza & Manik, 2015). In South African context, reconstruction vision can be viewed as an integration of social reconstruction practices to support social transformation agenda. Furthermore Khoza and Manik (2015) aver that reconstruction vision may encourage lecturers to use reflections to appraise their lecturing to become consistently self-refletive. Moreover, Valli (1997b); Smyth. et al. (1999) and van Manen (1977a) agree that reflection involves thinking about the social, moral, and political dimensions of schooling, suggesting that lecturers' reflection development growth level may enables lecturers to apply holistic approach in managing practiced curriculum matters. In addition to the above, Çimer. et al. (2013) contend that critical reflection must be seen as a process that encourages lecturers' awareness of ethical, political and moral implications that may negatively impact on their teaching practice. This implies that lecturers should be socialylly sensitive to prejudice practice in order to support the country to heal socially, and politically. Moreover, lecturers are encouraged to embark on self-empowerment through

practicing reflection as individuals as well as a collective college community to improve their professional practices (Impedovo. & Malik, 2016; Khoza, 2015b; Pedro., 2005; Schon, 1983b; van Manen, 1977a; Zeichner & Liston, 1987). Lecturers are expected to reflect on the reconstruction vision, social vision, personal and professional vision of their practices to empower students to attain outcomes as positioned by intended and practiced curriculum through goals, aims, objectives and outcomes.

3.3 Lecturers goals

Learning within school space is goal directed influenced by curriculum level positions (Macro, Meso or Micro) and purposes related to students, society and content (Berkvens. et al., 2014; Carl., 2002; Marsh., 1997). These goals may be broad statements in nature supported by aims, objectives, or outcomes. Furthermore, the curriculum delivery approach to the end-user may be inclined towards performance or competence models thus directing diverse goal messages at the practice destination (Hoadley. & Jansen, 2013). In line with the above, Kennedy., Hyland, and Ryan (2006); Donnelly and Fitzmaurice (2005) and Khoza (2015b) contend that goals towards which lecturers teach or facilitate, must be informed by aims, objectives and learning outcomes hence the definitions and understanding of these goals is crucial at practice level.

The aim can be viewed as an enduring goal while the objective seen as a short-term goals; both designate the lecturers' purposes. Contrary to that, outcome is what students should attain at the end of the lecture or session (Khoza, 2016) which is interpreted as concentrating on the output rather than the input of teaching (Marsh., 1997). In line with the above, Khoza aver that the outcomes are formed according to detailed, noticeable or quantifiable key words that reflect different levels of difficulties. In the ES&C NQF L4 subject- content, the content is represented by six subject outcomes and sixty-four learning outcomes however, the social re-engineering agenda content is not visible. In the South African context with reference to ES&C NQF L4 NCV curriculum, the NCV Policy 2006 positions the curriculum provisioning to be dual-content with theory making 40% and practical 60% (Wedekind, 2016b). The Revised ES&C NQF L4 subject guidelines (2015) are quite on practical and very vocal on theory. Wedekind (2016b, p. 202) argued, "Lecturers are ignoring practical dimensions of the curriculum and just teaching theory thus failing the intended curriculum broader aims". Similarly, the MTT Final Report (2013) also shared the same sentiments regarding the lack of practical involvement of the students which is seen as being counter-productive to social-economic, social efficacy, and the productive agenda. In line with these concerns, lecturers may need to reflect on the

application of the psychomotor domain as part of their practice especially when instructing the practical component in order to measure students' competence for a better-quality product. This may be done in line with full awareness of the implications of aims, objectives and outcomes as applied in curriculum implementation practice.

3.3.1 Aims

Aims are sometimes used to transmit authoritative messages from Macro to Micro-level to give a directive of what is expected of the curriculum from implementers, and Carl. (2002) regards this as process aims. Furthermore, Carl. (2002) maintains that process aims are those goals intended to present and foster functioning tactics of subject and the reasoning processes which may be fulfilled via that subject. This implies that the subject teaching process becomes a conduit through which other critical agendas are transmitted. In the context of ES&C NQF L4, all social transformation, social efficiency, social productive agenda, and principles underpinning the subject and objectives are typical examples of the process aims transmitted through SAQA ID 50441 and other official documents. In addition to the above, curriculum directives are transmitted from higher curriculum levels to lower levels to disseminate crucial operational messages to the implementers to alert them about what is academically expected of them and Carl. (2002) regards this as product goals or aims. These aims are content delivery oriented. Carl. (2002) maintains that product goals are those goals/aims oriented to the presentation and the regulation of the scholarly knowledge and competences or abilities achieved from that specific subject. In the context of ES&C NQF L4 NCV curriculum, product goals are transmitted through NCV Policy 2006, Revised ES&C NQF L4 SG & AG (2015) and SAQA ID 50441. In line with the above, process goals or aims give directives to the curriculum delivery approach which may either be competence or performance oriented or a hybrid of the two models. As you get to Micro-level, finer curricula specifics to guide the lecturers are crucial and therefore objectives and outcomes are used as they are closer to the lecturer.

3.3.2 Objectives

Objectives are commonly associated with lecturer-centred approach to curriculum delivery. Marsh. (1997) posits that objectives assist the planning process for the lecturer. Similarly, Carl. (2002, p. 111) contends that "objectives describes the required behaviour and outcomes, and the level of achievement which must be obtained". In addition, (Khoza., 2013b) and Kennedy. et al. (2006) maintain that objectives are explicit assertions that are produced according to the instructors plans, they are wider announcements of what a lecturer does for students during

lecturing and studying. Marsh. (1997) and Carl. (2002) concur that instructional objectives belong to the subject-lecturer and the learning objectives belong to students. The objectives "clearly spells out the learning profits" on the part of the students (Carl., 2002, p. 111), stating what the student will be able to do or know at the end of the lesson. According to Marsh. (1997), behavioural objectives which are criteria-based need be created in order to attain the learning profits. Moreover, the behavioural objectives criteria should reflect the evidence of achievement, conditions of performance and acceptable levels of performance. The following paragraph will explore the outcomes which are a dominate in the OBE, CBMT and CBET approaches to curriculum delivery.

3.3.3 Outcomes

Bernstein (1999); Hoadley. and Jansen (2013); Carl. (2002) and (Killen, 1998) concur that outcomes approach used in the content delivery places more emphasis on what a student ought to know, comprehend, accomplish and become, rather than what the lecturer anticipates achieving. Furthermore, Marsh. (1997) asserts that this approach concentrates on the output rather than input of teaching. In the South African context, outcomes are classified into subject outcomes (SO), and learning outcomes (LO) and these two are product goal oriented. In addition, the critical cross field outcomes (CCFO) and the critical developmental outcomes (CDO) are process goal oriented. According to Hoadley. and Jansen (2013, p. 240), "learning outcomes are derived from CCO and CDO", Furthermore, (Marsh., 1997) asserts that LO is a definition of what knowledge, competences and morals students should know, exhibit and be able to do at the end of the learning process. In the context of ES&C NQF L4 curriculum, there are six SO framed by topics to be covered, sixty-four LO (ES&C NQF L4 Revised SG (2015), seven CCO (NCV Subject Guidelines, 2015) and four CDO. In the same line of thinking, learning outcomes are based on the South African constitution and "linked to SAQA critical outcomes" (Carl., 2002, p. 116; Killen, 1998). (Khoza., 2013b) argues that learning outcomes (LOs) must be coupled to lecturer activities and evaluation plans in order for the lecturers to measure students' performance without bias. This argument is supported by Kennedy. et al. (2006).

For ES&C NQF L4 curriculum, lecturers are provided with subject and assessment guidelines (SG, AG), learner text book and lecturer's teaching guide. These materials are provided by text books publishers approved by DHET thus lecturers do not have influence on the learning material design. The expected student behavioural pattern is not defined nor is a student

tracking system report made available. Students' progress is measured by the number of LO achieved at the end, however, the CCO and CDO cannot be quantified as they are futuristic based on life long learning principles. It is therefore important for lectures to reflect on their teaching of ES&C NQF L4 curriculum. Furthermore, they should explore the implications of LO in a dual-content subject. Moreover, lecturers should consider and explore the application of psychomotor domain in learning and teaching for the improvement of the throughputs and students' practical proficiency.

The National Certificate: Vocational NQF L4 is positioned to prepare students adequately for smooth transition into the workplace by equipping them with practical knowledge, and competences related to a specific economic or occupational sector (DHET Senior Management, 2016; DoE Minister Pandor, 2006; SAQA Qualification ID50441, 2006). However, concerns have been raised by scholars regarding the disturbing practical training quality (Adam et al., 2015; Dasmani., 2011; HRDCSA TTT Report, 2014; MTT Final Report, 2013; Wedekind, 2016b). Moreover, the lack of a structured practical programme for ES&C NQF L4 and the in ability to frame the practical training using the relevant taxonomy as the case with theory (cognitive domain) is a concern in terms of students' practical proficiency development. In line with the above statement, a psychomotor domain developed by Dave (1970) and Simpson (1972) will be introduced and this model may be applied to both competence and performance discourses.

Dave's (1970) psychomotor domain is a five-layer model which is used to develop the student from low to advance levels of practical proficiency. Each level is guided by key words which the instructor uses as they develop LO or behavioural objectives to be achieved per level. The (Figure 2.3) shows the psychomotor domain and levels with upward mobility depicting complexity. At an institutional level in a simulated environment, students should achieve at least the precision level in order to be ready for the transition to the world of work.

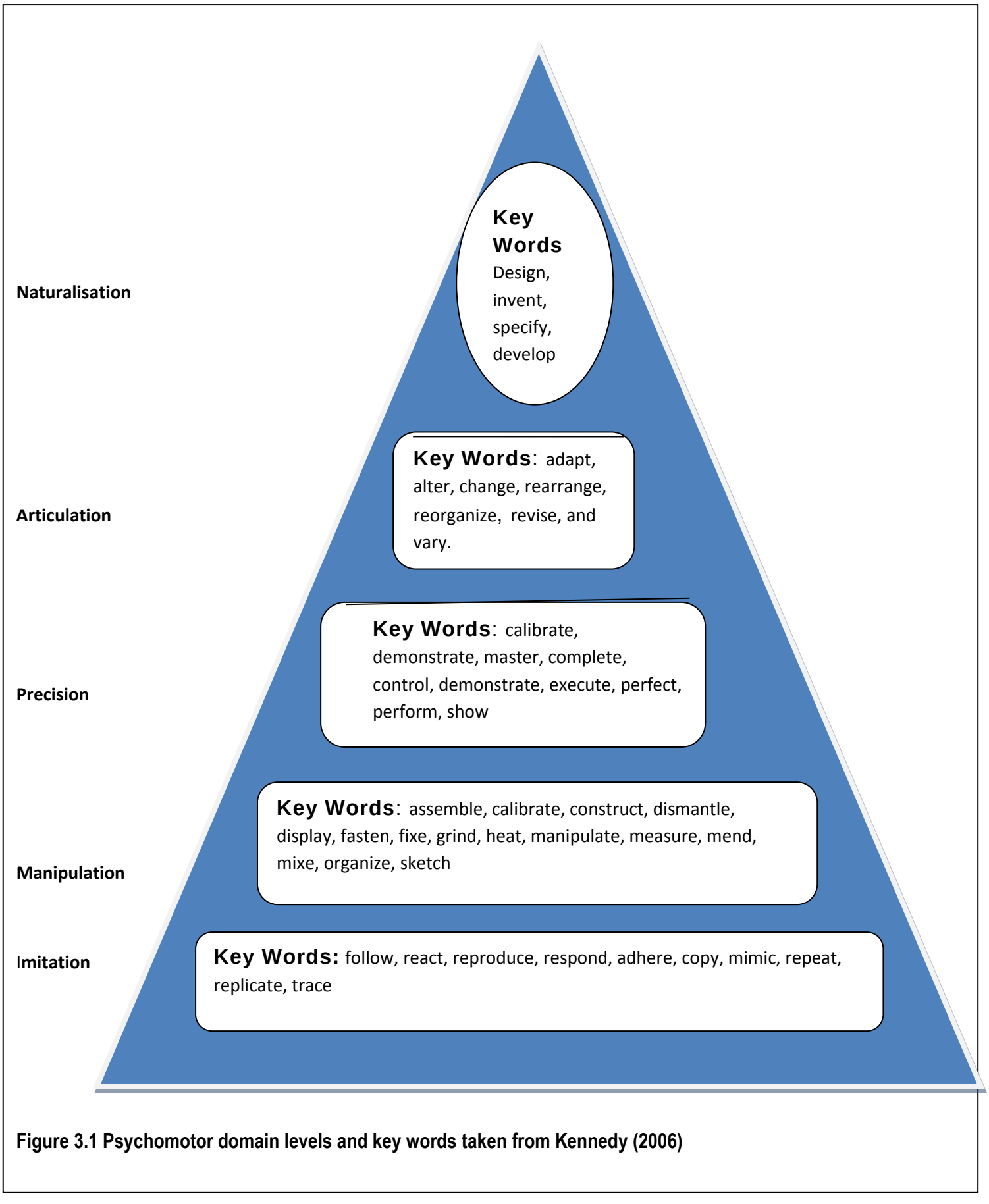

Figure 3.1 Psychomotor domain levels and key words taken from Kennedy (2006)

The table below provides the detailed description summary of how the student is developed from basic to advance levels.

Table 3.1 Summary of Psychomotor Domain Levels as Positioned by Dave (1970) And Simpson (1972)

	DOMAIN LEVEL	**DESCRIPTION**
1	Imitation / Guided Response	Observing the behaviour of another person and copying this behaviour. This is the first stage in learning a complex skill
2	Manipulation /Mechanism	Ability to perform certain actions by following instructions and practicing skills.
3	Precision/ Complex overt Response	At this level, the student has the ability to carry out a task with few errors and become more precise without the presence of the original source. The skill has been attained and proficiency is indicated by smooth and accurate performance.
4	Articulation/Adaptation	Ability to co-ordinate a series of actions by combining two or more skills. Patterns can be modified to fit special requirements or solve a problem.
5	Naturalization/Origination	Displays a high level of performance naturally ("without thinking"). Skills are combined, sequenced and performed consistently with ease.

The implementation success of this psychomotor domain depends on the availability of resources, practice, and the knowledge of the instructor. Using the psychomotor model in the training of students could result in: (a) Student confidence and mastery of the skills taught or learned; (b) Turnaround time improvement and the ability to improve on procedural technique application. Moreover, techne' which is a technical competence will be enhanced followed by phronesis which is practical wisdom leading to higher emotional intelligence skills (Jamal, 2010). Thus the achievement of high skills and knowledge underpinning principles as positioned by SAQA ID 50441 may be realised. The success in achieving the desired aims, objectives and outcomes will be influenced by the availability of content and the supporting high quality learning material (Van den Akker et al., 2009).

3.4 Electrical Systems and Construction NQF L4 content

According to Berkvens. et al. (2014, p. 18) content is defined as ”knowledge, skills, attitudes and values” and these culminates in learning activities that students experience in and outside of school. Moreover, knowledge of literature or methodology in teaching and facilitation is essential. According to Koehler. and Mishra (2009) content knowledge is teachers' knowledge about the subject matter to be taught. Koehler and Mishra (2009) noted the importance for the teacher to have the pedagogical knowledge which is viewed as the teachers' deep knowledge about the processes and practices or methods of teaching and learning. In addition to this, Koehler and Mishra (2009) posit that technological pedagogic knowledge content is an important component to be considered especially, in this dynamic technological era dominated by both analogue and digital technologies. Furthermore, Shulman (1986) accentuated the importance of the subject matter content knowledge and the curricular content knowledge as critical components of content knowledge. Furthermore, Shulman (1986) asserts that subject matter content knowledge is a display of subject matter mastery by a lecturer or teacher, which may be achieved through mastering subject conceptual themes**.** The curricular content knowledge at practiced level is represented by programme designed for teaching of the subject (ES&C NQF L4). Themes should be at an appropriate level supported by the relevant instructional materials. In the context of ES&C NQF L4, there are six subject (SO) with their respective learning (LO). Furthermore, subject guides, assessment guides, lecturers' teaching, and student's learner guides are provided by DHET sourced publishers.

Van den Akker et al. (2009); Shulman (1986); Berkvens. et al. (2014) and Hoadley. and Jansen (2013) concur that key content determinants are: goals of teaching and learning; an approach to be adopted for teaching and learning, and lastly the needs which may be societal, professional, or personal. SAQA Qualification ID 50441 and NCV Policy 2006, posit that the National Certificate: Vocational NQF L4 is aimed at empowering TVET College students with academic knowledge to be able to articulate to Higher Educational Institutions. Furthermore students will be equipped with practical knowledge and skills related to the socio-economic sector for smooth transition to the world of work for them to participate in the economy and for self-development. In line with the above, the educational approach adopted for delivery is OBE (ideological-ware) where content is not prescribed therefore not prioritised while the learner is privileged (learner-centred) at the expense of the lecturer who has become a facilitator (Hoadley. & Jansen, 2013). Furthermore, OBE is a horizontal/competence approach influenced

by public opinions. Contrary, performance/vertical approach which encourages school knowledge based on international standards (Bernstein, 1999; Hoadley. & Jansen, 2013).

In the South African context, (especially in the TVET College context) the integration of pedagogic, technological pedagogic and subject content knowledge mastery is crucial given that the curriculum and political vision demands that learners be theoretical and practically capable in order for them to be employable. Therefore, it is important to know how the ES&C NQF L4 subject-content is structured.

3.4.1 Subject-content (Dual-content)

The ES&C NQF L4 is two prong content designed to provide strong theoretical knowledge (40%) and integrated practical (60%) as positioned by the NCV Policy, 2006. Furthermore, the curriculum content carries ideological component (Hoadley. & Jansen, 2013). DHET prescribed lecturer guides, subject guides, student text books and assessment guidelines which are content sources used by both learners and lecturers to organise learning. While theoretical knowledge delivery is clearly structured, the practical content which is a key component is not structured leading to lecturers using the Integrated Assessment Tasks (ISAT) as a practical training guide. MTT Final Report (2013) and HRDCSA TTT Report (2014) revealed that " the practical component of the qualifications is not sufficiently embedded in the curriculum and learners do not get the necessary practical training and even in the simulated environment, the training is frequently given from a very academic/theoretical perspective" (MTT Final Report, 2013, p. 18). Furthermore, the ES&C NQF L4 content as captured in subject and assessment guidelines (2015) version seems to be biased towards cognitive domain with less voice on the psychomotor domain yet the policy stresses the need for learners to be practical capable for employability. International studies reveal that it is important to align theoretical and practical knowledge.

The Indian National Skills Qualification Framework provides a structured framework detailing training requirements which are classified as the following: professional knowledge (trade theory) six hours per week, professional skills (trade practical) twenty-five hours per week, workshop calculations and science two hours per week, engineering drawing three hours per week, employable skills two hours per week and extra-curricular two hours per week. The professional knowledge is structured to give guidance on areas to be covered by students to attain outcomes based on the skills developmental goals set by the government (Directorate-

India). Furthermore, in South Africa, the Electrical Technology grade 12 subject-content, is provided with general aims and specified objectives to guide the teachers.

In addition to that, the practical guide is properly structured detailing practical and projects to be done after each learning area. Furthermore, workshop training and teacher to learner ratio is 1:15 and learners are expected to do summative practical assessment task (PAT) at the end of the year (DBE, 2014). Both the Indian directorate and DBE specified the academic requirements for the teacher qualification to be appointed to drive the content. However, for ES&C NQF L4, the lecturers' professional qualifications is not specified. In the context of the above, lecturers' reflections of the teaching of ES&C NQF L4 is crucial in order to explore strategy to structure effective practical content and time split (60:40: practical: theory). Successful content delivery will depend on the competence of the lecturers and their effectiveness at implementing their roles and therefore the following paragraph will explore lecturer's roles.

3.5 Electrical Systems and Construction NQF L4 lecturer's roles

In the South African context, the DHET curriculum vision is to produce knowledgeable and practical capable learners who are able to articulate to the world of work as well as to Higher Educational Institutions of learning (NCV Policy, 2006). This vision seeks to address both the academic aspiration of learners and industrial labour needs. The ES&C NQF L4 subject-content provides theory knowledge and practical to be facilitated by the lecturer to students. For the theory facilitation and practical training, a multi-purpose classroom is used. Therefore, the lecturers' roles could either be a facilitator or trainer.

Khoza. (2013a) and Khoza (2015b) in collaboration with Hoadley. and Jansen (2013), concur that effective curriculum delivery is dependent on the correct alignment between the approaches selected and the roles assigned to the lecturer. For performance model which is lecturer-centred the role becomes an instructor (behaviourists) and for the competence model being student-centred, the role becomes a facilitator (constructivists) (Khoza, 2015b). Furthermore, the last approach is content-centred (cognitivists) where the lecturer role becomes an assessor (Khoza., 2013b). These approaches are critical for curriculum delivery success which may be achieved if acceptable link and cohesion is created between intended, the enacted/implemented and the assessed curricular. In addition to the mentioned roles, novice lecturers are a responsibility of the seasoned lecturers who understand the culture of the organisation.

Studies have revealed that novice lecturers require structured and organised support mechanisms in order to succeed in the teaching profession. Furthermore, there is a need for proper inductions with experienced lecturers assigned the responsibilities to coach, motivate and mentor the novice lecturers (Ginsberg & Kingston, 2014; Ingersoll et al., 2007; Kauffman, Johnson, Kardos, Liu, & Peske, 2002). According to Britton, Raizen, Paine, and Huntley (2000), novice lectures are shown to their classrooms and left alone to sink or swim. However, comprehensive, high quality induction and mentoring, accelerates the novice lecturers' effectiveness and may result in a huge positive impact on students' achievement (Darling-Hammond, 2006; Fletcher & Strong, 2009; Ingersoll & Smith, 2004) In the context of the above, seasoned lecturers are required to role play as coaches, mentors, motivators and leaders to the novice lecturers in support of the attainment of the intended, implemented and achieved curriculum. The novice lecturer induction is an area that needs focus. There is a need for a study how TVET Colleges manages induction, mentoring, and coaching of novice lecturers.

Studies conducted from five EU countries, four African countries, Asean countries to establish types of lecturers/teachers commonly found in TVET system responsible for curriculum enactment and implementation at Micro-level revealed the following teacher types: theory only teachers, practical training teachers, instructors' combination of theory and practical, core subject teachers/lecturers and advanced skills theory teacher (master-craftman). The above views were supported by the following scholars, Córdova, Gérard, Melis, Nixon, and Rumpker (1995); Hippach-Schneider, Krause, and Woll (2007); Lipsmeier (2013) and Grijpstra et al. (2015b). The above study revealed that global countries use the same terminology to define different meanings. For instance, core subject in EU and Asia meant Mathematics, Languages, Life Orientation and Technical Drawing. Contrary, in South Africa, the term fundamentals is used to define the subjects mentioned. On the same token, core subjects mean technical subjects within the discipline. For example in the Electrical Infrastructure Construction (EIC) NQF L4, these subjects are Electrical Principles and Practice (EPP); Electronic Control and Digital Electronics (EC&DE) and Electrical Workmanship (EW).

The study also revealed that the master-craftman (highly technical specialised practitioner) is commonly found in teacher education institutions. Furthermore, Malloch and Helmy (2015), in their study based on Indonesia and Australia TVET teacher reflections and trends identified critical competences which a TVET teacher needs to have in order to succeed in their profession and these includes: pedagogic; personal; social and professional competencies. In addition,Gamble (2013) insists on the need for the TVET College lecturer to have subject

knowledge and pedagogy expertise. The teacher competence is commonly seen through quality teaching he brings to learners which is also influenced by teaching activities he provides and thereafter the success of the learners. Furthermore, Wedekind (2016b) contends that there is a need for policies to guide lecturers in the application of resources to ensure the alignment between learning outcomes, content and lecturers knowledge in order to attain the desired outcomes.

At an Accelerated Artisan Training Programme (AATP) MERSETA sponsored conference held in Johannesburg, South Africa, Dr Felix Rauner an expert in skills development, identified critical competence levels a TVET lecturer/trainer must have to be an effective curriculum implementer. These levels are mentioned below.

The first level is Functional competence which is a level attained by a VET lecturers and trainers who have acquired fundamental vocational-pedagogy and specialist knowledge. Furthermore, he posited that the pedagogical and subject specific knowledge are to support the lecturer/trainer/facilitator to guide the learning and training actions. Further to this, the next level is called Processual competence which is competence displayed by the TVET lecturer/facilitator/trainer when they are able to apply their professional knowledge adequately in situations of TVET practices to reflect their knowledge and to engage in futuristic educational planning of learning. Moreover, the lectures that have attained this level will have the ability to design and, arrange technical and vocational learning processes in their enactment or implementation of the intended curriculum and be part of the professional community (Rauner, 2012). In addition to the above, the last level is called Holistic shaping competence, which represents the ability to solve vocational pedagogical tasks effectively. Rauner alluded that the above include the criteria of social compatibility of lecturers/trainers work as well as the ability to integrate vocational learning processes in the socio-cultural environment. Moreover, the lecturer/trainer must be conversant with the specifications of the curriculum considering the resources requirements and availability. Therefore, the lecturer at this level must be able to improvise where there are challenges. In the context of ES&C NQF L4 where some subject topics are abstract, it may call for the lecturer to plan in advance the education excursions in order to expose students to reality. In the South African context, lecturer entry qualification to a TVET College is currently based on paper qualifications rather than what the lecturer/trainer/facilitator can do. Furthermore, there is a lack of institutions to produce TVET College tailor-made lecturers.

3.5.1 Hindrances and threats to lecturers' effectiveness

In South Africa, the national study conducted by National Business Initiatives (NBI) of lecturers across a range of fields in 2011 revealed that an approximation of half of lecturers deployed to teach NCV programmes (including ES&C NQF L4) had no industrial experience (Gewer., 2016). Similarly, Umalusi Quality Council Report (2013, p. 200) based on their quality functioning mission conducted at TVET Colleges, remarked that "lecturers require training if they are to keep abreast of changing curricular, new approaches to teaching methodology (e-learning) in their respective subjects and trends in industry". Furthermore, Umalusi Quality Council Report (2012, p. 212) remarked that ''more practical work should be covered, and more hands- on practical work linked to the subject topics covered in the curriculum to enhance students understanding of complex concepts". Moreover, the report stressed the importance of using simulation as a teaching and learning tool. In addition to this, Umalusi in their report, urged management to employ suitable qualified and competent lecturers supported by in-service training workshops throughout the year to ensure effective teaching, learning and examination preparation. The meaning of the above study findings and reports indicates that there is a lack of technical and industrial exposure capacity to drive the practical component of the programme where the practical is supposed to be 60% of the time and theory being 40%. Furthermore, there is high possibility of low-quality workshop standards which may be caused by unaccredited workshops leading to poor or no training in preparing these students for the world of work.

However, while the above are great contributions for the improvement of quality teaching and learning, time to organise in-service training during the learning calendar tends to be problematic to schedule because of heavy teaching loads and budgetary constraints faced by these TVET Colleges. Furthermore, learning and teaching cannot be achieved in the absence of learning resources therefore the following paragraph will explore learning resources utilised in the teaching of ES&C NQF L4 dual-content.

3.6 Resources to teach dual-content: Electrical Systems and Construction NQF L4

Curriculum vision and goals attainment at Micro-level might be difficult if not impossible without relevant learning/teaching resources support, especially when complex dual-content is to be taught.

According to Khoza (2015b), resources are defined as anything that facilitates or initiates learning or any person or thing that communicates learning. Similarly, Akinsola and

Ongukola (2013) describe resources as the total of everything either used directly or indirectly for the purpose of educational training to promote, encourage and facilitate teaching and learning activities.

In line with this, Hoadley and Jansen (2013) posit that resources include the lecturer/teacher/trainer, time and physical resources which are main contributors for effective curriculum delivery at practiced level. In the same line of thinking, Khoza (2015c) and Khoza (2015a) identified three types of resources required in education namely hard-ware (HW), soft-ware (SW) (tangible) and ideological-ware (IW) (not tangible). The HW includes machinery, equipment, technical plans, digital projectors, training consumables, tools, textbooks, subject guidelines, assessment guidelines. SW involves actual information transmitted known as technology–in-education (TIE). These includes YouTube content, blended learning soft-ware and Programmable Logic Control technologies soft-ware (Criticos, Long, Moletsane, & Mthiyane, 2005). The IW known as technology of education (TOE) includes the vision or philosophical ideas, theories and thoughts involved in the use of HW and SW resources (Khoza, 2018; Khoza., 2013a).

Amory argues that learning is about TOE as opposed to TIE (technology- in education). Khoza (2015c) suggest that the curriculum implementers (lecturers) should understand the TOE or IW resources that underpins the intended curriculum before the implementation process which implies to know whether the delivery approach to use is content-centred, learner-centred or subject–centred. Furthermore, lecturers should make sure to adopt the appropriate teaching strategy. Aligning the three types of resources during planning and implementation/enactment of the curriculum may result in positive achieved curriculum (Hoadley. & Jansen, 2013). Finances is equally an important resource in education and training and yet the above scholars excluded it.

For Electrical Systems and Construction (ES&C) NQF L4 which is dual-content with abstract concepts, visual and audio learning assistants are crucial for effective learning to achieve the intended outcomes. According to Singh (2005), visual aids are instructional devices which are used in the classroom to encourage learning and make it easier and motivating. In addition, Kishore (2003); Shabiralyani, Hasan, Hamad, and Iqbal (2015) and Burrow (1986) concur that visual aids stimulates thinking, motivate and encourage students to focus attention while the instructional process is in progress. Furthermore, the amalgamation of both visual and audio stimuli may be effective especially since two important senses namely hearing and sight are

involved. Learning and teaching resources discussions cannot be completed without the inclusion of e-learning resources.

Moreover, TVET Colleges (in South Africa), computer labs are mainly used for teaching Life Orientation subject (End user computing), and Graphic Design thus making it difficult for students to access additional e-learning activities as required by their subjects. Moreover, computer labs are locked after college working hours because of theft. Furthermore, the library resource centre may not have sufficient resources to cope with student numbers. E-learning resources are a crucial area for TVET College students. In line with the learning resources at TVET Colleges, there is a need for a study to be conducted on the availability, suitability, and sufficiency of the teaching/learning/training resources to meet the ES&C NQF L4 subject outcomes. Furthermore, the study should explore the impact of resources scarcity to the effective delivery and the attained curriculum. The innovative learning resources are not complete if multimedia is excluded therefore the next paragraph explores multimedia.

The lesson supported by an integration of sound, colourful video and motion as a teaching/learning aid, brings reality to the classroom or workshop/laboratory and also captures the attention of students with few difficulties from the lecturer. This is the power and value multimedia brings to a learning settings. In line with this,Gayeski. (1993) and Gilakjani (2012), concur that multimedia can be defined as any computer-mediated soft-ware or interactive application that integrates text, colour, graphical images, animation, audio, and full motion video in a single application. YouTube used for educational purposes is a typical example of multimedia technologies used as learning resources. The application of multimedia technologies especially when teaching complex concepts like Electrical infrastructure, which deals with Power generation and transmission networks as found in the ES&C NQF L4 subject, removes the burden of explanation challenges.

In addition to the above, Gayeski. (1993) pines that for interactive multimedia to be effective, the design should be aligned to the intended lesson outcomes and moreover, he cautions that the ratio of computer information to the video scenes in an interactive lesson must be considered for effective lesson. Gayeski have also revealed that teaching space conduciveness with a provision of multimedia resources is attractive to students and it also enhance their participation in a class. Vocational based students learn best through seeing, and touching rather than using their hearing sensor alone (Gayeski., 1993; Gilakjani, 2012; Khoza., 2013a; Mayer, 2001).

3.6.1 TVET College context (SA) resources challenges

In the context of the TVET College in South Africa, for ES&C NQF L4 subject of which the content is made of six diverse subject outcomes (SO), relevant and sufficient material resources, and consumables should meet the practical and knowledge needs for students to reach their full potential.

In line with the above,the DHET provides students with learner-guides, lecturers'- guides which are purchased from the DHET appointed publishers. Lecturers do not have any academic input in the development of the students' and lecturers' textbooks content to ensure there is alignment between the subject-content and learning-outcomes. In addition, the student is issued one prescribed textbook as a reference for the study. Studies reveal that resource scarcity may lead to lecturers shifting from student-centred to lecturer-centred approaches in order to improvise for the intended outcomes to be achieved (Ibeneme, 2000; Kehdinga, 2014). While text books and subject guides seem to be key resources, training facilities and relevant training material are equally important in order to produce practical capable students. This material challenge was affirmed by the HRDCSA TTT Report (2014) in their research findings on TVET College challenges and Policy review. In line with the above, the study conducted by Dasmani (2011) on challenges facing Ghanaian technical institutions on effective preparation of technical students, revealed that generally there is inadequacy in the provision of instructional materials which leads to teaching practice focusing more on theory, leading to trainees lacking proficiency in their chosen fields of specialisation. In addition, the study also pointed to student/teacher ratios as a huge contributing factor at producing low technically qualified students.

For practical training, hard-ware and soft-ware resources must be compliant to quality standards set by either Quality Councils for Trades Occupations (QCTO) or other relevant Education and Training Quality Authorities (ETQA) for the facilities to be credible and accredited. In line with different types of learning/teaching resources discussed, there is a need for lecturers' reflections at practical and critical levels to explore the availability and effective utilisation of such resources in order to address gaps between traditional teaching lessons and inter-active e-learning aids supported lesson.

Ranasinghe and Leisher (2009) warns that technology should support lecturers in creating collaborative learning environment. Similarly, Koc (2005) contends that the integration of

technology into curriculum means using it as a tool to teach academic subjects and to promote the higher-order thinking skills of students.

Some of the merits of the resources according to Khoza (2010) and Berkvens. et al. (2014), help in knowledge delivery and further trigger the interests of students in the subject lesson. However, for effective digital aid design, more time and knowledge are needed which is the scarce commodity. The value of resources in education and training is dependent on how effective they aredeployed for lectures to enact the curriculum to achieve the desired throughput.

3.7 Teaching, training, and learning activities for Electrical Systems and Construction NQF L4

Broader curriculum goals of promoting social cohesion, active citizenship, personal and professional fulfilment, adaptability and employability cannot be realised without education and training as a delivery vehicle (European Communities, 2006; National Planning Commission, 2012; SAQA Qualification ID50441, 2006). Education and training delivery mode may be formal, informal, or non-formal for the goals to be realised. According to (Khoza, 2015c) , learning is the positioning of aims, objectives, learning outcomes, teaching/learning activities, relevant teaching philosophy, resources, time, space and assessment in a manner that is understandable by students. Learning activities are the dominant component of the learning process and can be defined as "any activities of an individual organised with the intention to improve their knowledge, skills, and competence" (European Communities, 2006, p. 9). In the same line of thinking, Chou (2011) regards learning activities as the experiences that students need in order to have particular behavioural competences. It is important to note the implications of the formal learning activities, the non-formal learning activities, and informal learning activities from a qualification achievement awarding perspective.

The formal learning activities are institutionalised, organised, intentional, structured, following a ladder (progression). Learning activities could occur at a school, college or university and the end results may lead to an achievement award in a formal NQF registered qualification. On the contrary, the non-formal learning activities may be intentional, organised, institutionalised but is less structured, and achievements do not lead to the NQF registered qualification award. The informal learning activities may be intentional but it is less structured, less organised and more suitable for home education and training (European Communities, 2006). Moreover, the "alignment between content learning activities, learning outcomes and the teaching/learning resources is important for any successful curricular implementation" (Khoza, 2015b, p. 113).

In order to be certain that learning/teaching activities leads to the desired outcomes, assessment for learning process activities (informal assessment) must be conducted either by the lecturer, individual activities or, group activities. Kennedy, Hyland, and Ryan (2006) assert that the activities undertaken by the lecturers and students assessing themselves, results in feedback information helping to modify teaching and learning activities being pursued. In line with this, Berkvens, van den Akker, and Brugman (2014, p. 18), contend that learning should happen through "interesting learning activities carried out in an inspiring environment that provides adequate teaching and learning material". Furthermore, educational excursions should be promoted and catered for in the annual plan to expose students to the real-world environment especially when teaching a dual-content with complex theoretical concepts. Moreover, formal assessment activities (summative assessment) on theory and practical (ISAT) should be done to provide articulation opportunities for students for further learning at higher educational institutions and create employment opportunities. In line with the above, lecturers' reflections in the teaching of ES&C NQF L4 may bring light on why, how and when these activities are implemented at Micro-level.

In the South African context, the ES&CNQF L4 subject is outcome-based with an emphasis on both theory and practical. At Micro-level, subject guides (SG) are provided with the DHET prescribed students textbooks as learning resources to deliver the implemented curriculum content. The subject guidelines for ES&CNQF L4 (2015) is composed of six subject outcomes which are supported by learning outcomes and the critical learning development outcomes (CLDO). The learning content is captured on the textbook where the theory knowledge outcomes are positioned by cognitive domain levels (Revised Assessment Guidelines, 2015). Formative learning and assessment activities are provided at the end of each sub-topic, meant for individual and group activities. The textbook also provides web-pages as references for some of the theoretical concepts and activities (Sparrow Consulting, 2014). The textbook does not specify the practical content which is supposed to make 60% of the learning time according to the SG ES&C NQF L4 (2015). In line with the theory and practical training, van Manen (1977a, p. 20) asserts that the "goal of theory is the truth while practical is associated with action". In addition, "theory thinks the world while practical grasps the world" (van Manen., 2007, p. 20). The implications of van Manen remarks for ES&C NQF L4 lecturers at TVET College is that holistic student development requires a balance of theory knowledge and structured practical components to be able to produce competent, and practically capable students for employment possibilities. The practical assessment activities should develop

abilities in the student to value the beauty of the project being manufactured and also safety-awareness, time consciousness and neatness habits.

In same line of thinking, lecturers' reflections should explore how affective and psychomotor domains are integrated in dual content subject in order to produce competent students. Studies reveal that through reflection, lecturers transcend to reflective teaching practitioners who are able to demonstrate the ability to analyse the process of what they are doing while at the same time make judgement to modify their practice so that it matches the needs of students (Reiman, 1999; Schon, 1983a).

3.7.1 Knowledge relevance and applicability concerns

Studies conducted by Khoza (2015b) and Orland-Barak and Yinon (2007a) revealed the importance of teacher awareness of the connection between curriculum levels which suggested that the learning or teaching activities should be in line with the relevant approach chosen in order to achieve positive results However, according to United Nations Educational, Scientific and Cultural Organisation UNESCO (2011), concerns are often expressed by global agencies such as the Organisation for Economic Co-operation and Development (OECD), governments, employers and professional associations about the applicability and/or adaptability of what is learned in educational institutions. Further to this, a common call is made for workplace experiences to make up a greater component of programmes that are preparing students for occupational outcomes Billet (2013). In the South African context, studies reveal that the NCV curriculum was originally designed to provide 60:40 practical: theory: ratio. Furthermore, studies reveal that at most TVET colleges, NCV qualification is made of 80% theoretical knowledge with 20% practical and this challenge is attributed to low practical skills of lecturers and high enrolment numbers which is against the 15:1 workshop norm (HRDCSA-TTT Report, 2014; MTT Final Report, 2013). The adaptability and applicability may be addressed through continual curriculum review and moreover, lecturers should continually visit industry to see technologies being used in order to adapt the training part of the curriculum to pace TVET College with industrial expectations. Therefore, it is essential for lecturers' teaching ES&C NQF L4 at a TVET College campus to reflect critically on how the college campus compensate the workplace experience in developing students for employment readiness. The success and quality teaching of ES&C NQF L4 is dependent on the teaching location (space) and workshop facilities available.

3.8 Teaching, learning and training location for the Electrical Systems & Construction NQF L4 curriculum.

Learning and training environments are key critical components of curriculum delivery, and the support to lecturers in their pursuit to guide student from novice to acceptable competency standards (Lave & Wenger, 1991; Rauner, 2007). Therefore, for TVET College, conducive theory learning space, accredited workshop and computer laboratories are key critical components in the implementation and the attainment of the intended curriculum.

The credibility of the training depends on the accreditation status of the workshop, the trainer competence and the availability of other support resources. The conduciveness of the learning location implies classroom compliance to health and safety standards, a sufficient number of desks and chairs, enhancing educational charts and a fully furnished environment. Furthermore, a conducive and inspiring learning environment, may motivate student to learn. For ES&C NQF L4, the practical training requires sufficiently equipped workshop with relevant and functional models required for training. In the absence of workplace exposure, the training workshop is the only space that represents the world of work, and therefore should be sufficiently equipped to motivate students. Berkvens. et al. (2014) recommend the flexibility of the learning environment to include outside of the classroom learning opportunities to entice students. Moreover, for the ES&C NQF L4, projects and on-site training can full- fil the recommendation.

The ES&C NQF L4 is a horizontal oriented, OBE driven curriculum which is learner-centred and promotes local knowledge needs, everyday/ general knowledge (Bernstein, 1999) and (Khoza, 2015b). However, in order to produce competent and confident students, structured, fully equipped workshop is essential. Therefore, for the successful transition between the college environment and the world of work, the "classroom and workshop environments must reflect professional standards expected of students in a working environment" (Zungu & Munakandafa, 2014, p. 14). Furthermore, TVET College education and training is about developing student's aptitude to solve problems. To develop this competence, knowledge construction and the acquisition of problem-solving skills must be stimulated through making the learning environment problem-based. Moreover, the learning environment must allow the lecturer to conduct assessment, apply appropriate facilitation approach, and provide feedback to students (Zungu & Munakandafa, 2014).

In the context of South African TVET College system, a conducive learning environment motivates students to work hard to realise their dreams of graduating from being novice to experts thus being able to contribute meaningfully in the development of the country's economy**.** Teaching resources, learning activities and the space allocation to teach ES&C NQF L4 may not be enough if time is excluded.

3.9 Time allocation for teaching, learning and training of ES&C NQF L4 students

Hoadley. and Jansen (2013) opined that time, physical resources and human resources are key ingredients for successful curriculum delivery. Furthermore, Orstein and Huskins (2004) aver that time is a valuable and non-renewable resource which must be economically managed to yield positive results. In support of the above scholars, Orland-Barak and Yinon (2007b) posit that the more time spent by both students and lecturers inter-acting educationally, the better the curriculum delivery and results become. Therefore, effective time management and the distribution across curriculum activities is essential. In the context of the above, this section intends to explore time as a resource, and how it has been allocated in similar programmes to ES&C NQF L4; how time is allocated for dual-content (ES&C NQF L4).

The closest international model to ES&C NQF L4, is the Electrician NSQF L4 competence based curriculum sourced from the Indian qualifications (Directorate General Training India, 2015). This qualification is under the Craftsman Training Scheme (CTS) and the course duration is 24 months spread across four semesters. This competence/horizontal programme is made of five outcome statements stemming from five domains namely: (1) Process; (2) Professional Skills; (3) Professional Knowledge; (4) Core Skills and lastly (5) Responsibility (Directorate General Training India, 2015). The literature reveals that the total time spread each week on these five domains is 40 hrs. Therefore for purposes of this study, our focus will be on how time is spread across Professional Knowledge (theory) and Professional Skills (trade practical). According to the literature, twenty-five hours (25) is allocated to the Professional skills (trade practical) and six hours (6) allocated to Professional knowledge (theory) per week and the remaining nine hours is spread among the other three domains. This implies that the time spread is an 80:20, practical to theory ratio. Lecturers need more time to spend with students on practical training to develop skills (how) and values (why) in order to be employable.The Indian model seems to be well structured in terms of time allocation as well as guidance to theory and practical scope. The following paragraph will explore how time is spread across different topics of the ES&C NQF L4.

The ES&C NQF L4 is a twenty credit (200 Notional Hours) programme made of six (6) subject outcomes or topics. The ES&C NQF L4 subject is a dual-content which is supposed to be 40:60 theory/practical, implying that 40% of time allocation should be dedicated to theory and 60% dedicated to practical component. According to ES&C NQF L4 subject guidelines, time allocation to different topics is as following:

Table 3.2: Time allocation across Electrical Systems and Construction subject topics

ITEM No	TOPIC	WEIGHT (%)	TEACHING HOURS	NUMBER OF LO	THEORY & PRACTICAL
1	Electrical Infrastructure	20	22	7	Theory only
2	Construction of a three-phase circuit	15	16	6	Theory + Practical
3	Construction of a three-phase medium voltage overhead supply to domestic houses	15	17	10	Theory + Practical
4	Inspection of a three-phase industrial/commercial installation	20	22	7	Theory + practical
5	Fault-finding and maintenance of three-phase voltage electric circuits	15	16	12	Theory + Practical
6	Renewable energy system	15	17	22	Theory + Practical
			110 hrs pa		

(Taken from ES&C NQF L4 subject guideline)

The above content seeks to highlight time distribution across topics, number of learning outcomes (LO) and the content (Theory + Practical). The face-to-face minimum teaching hours' guide provided by ES&C NQF L4 does not separate time spent on practical modules and knowledge modules. Furthermore, no provision is made for educational excursions to accommodate electrical infrastructure topic which covers electrical generation, power transmission and other complex hard-ware found in power-substations. In addition to the above, the time allocated (110 hrs pa) exclude internal and external assessment times, integrated summative assessment (ISAT), and computer lab attendance to explore web-sites (e- learning) areas recommended in the textbook. Recovery time for assessment of students who could not write ICASS is also not clarified. The practical training time-table should at least take the whole day rather than hours within a day. More time is required to organise tools

for students at the beginning as well as when returning tools, equipment and cleaning at the end of training. The instructor also needs time to do stock-taking of both tools and training facilities. Moreover, the instructor needs time to procure stock and planning. The failure to have tools, material and equipment may result to poor training. Lectures teaching ES&C NQF L4 require critical reflections to explore time allocation spread between theory and practical. These reflections may empower lecturers to be proactive in finding curriculum delivery related solutions.

Time-table scheduling seems to provide guidance to students and lecturers regarding when and where a particular subject is facilitated. The issues of educational excursions, site visits and computer lab access for e-learning learning requires separate time plan which may be developed by both the lecturers and the campus management of the TVET College or the involvement of the academic board subcommittee. In conclusion, time remains being the key component of curriculum delivery to achieve the TVET College mandate as positioned by NCV Policy 2006. Therefore, proper planning as to how time is allocated effectively to cover both theory and practical, will require the TVET College academic board provide guidance and this should not be done in the exclusion of lecturers and students leadership. Access to education and training has become a concern for the South Africans especially among the underprivileged community and therefore, the following paragraphs will explore accessibility.

3.10 Students and lecturers' accessibility to ES&C NQF L4 NCV curriculum

Access to TVET College education means making it possible for more individuals to enrol. However, from a social justice perspective, access to education is the right of all individuals (Altbach, Reisberg, & Rumbley, 2009; Berkvens. et al., 2014; Bernstein, 1987; Government of South Africa, 2017; Malle, Pirttimaa, & Saloviita, 2015). In line with the above, the South African Senior Management (DHET top management officials) in presenting the National Development Plan 2030 vison for the Medium Term Strategic Framework Budget alluded that the "NDP envisages that by 2030, South Africans should have access to education and training of the highest quality" (Republic of South Africa MTSF 2014-2019, 2013, p. 22). The implication of the above is that students should have access to TVET College education to study ES&C NQF4 regardless of their ethnicity, gender, race and socio-economic status.

3.10.1 Access to TVET College enrolment influenced by financial access, physical access and cultural access.

The cost of attending post-school education is expensive and includes not only tuition fees, but textbooks, transport costs, accommodation and other living expenses. Families go to extraordinary lengths to help finance further education. Moreover, often it need additional financial support. Furthermore, unemployment and poverty of the parents for the disadvantaged students creates barriers to access to the TVET College. The post-apartheid government has committed itself to assist financial deserving students through NSFAS in order to provide universal, equal access to good education and equal rights for all students (DHET Senior Management, 2016). The government is currently providing 80% subsidies of the cost of NCV programmes and NSFAS to cover the remaining 20% financial accessibility (Papier, Needham, Nicola Branson, & Hofmeyr, 2015).

In addition to the above, student village promised by DHET in 2012, which is part of the 2030 vision and captured in the Strategic Infrastructure Projects (SIP), aimed to assist students attending P-SET institutions. Its service is yet to be extended to the TVET college students' community, especially those campuses with no boarding facilities. This service may also present an opportunity for students to obtain bus transportation from the student village to campuses.

3.10.2 Who enrols at TVET College?

Studies reveal that TVET Colleges attracts students from a wide range of academic backgrounds (Department of Higher Education & Training, 2013; Zungu & Munakandafa, 2014). In support of DHET report, Gewer. (2016) asserts that students enrol at TVET Colleges by chance caused by circumstances for example not finding space at university or poor performance from the previous academic school.

The enrolment and registration for a chosen qualification requirement also allows Grade 9-12 results at entry point resultingin a diverse student profile, both academically and with regard age, sitting in the same class. This has huge implications to curriculum delivery and classroom management, including barriers to knowledge and skills acquisition (Department of Higher Education & Training, 2013). Furthermore, a study conducted by Wedekind (2016a) based on lecturers' perceptions and experiences about the diverse students enrolment at TVET College

as instructed by DoE, revealed that lecturers had frustrations which resulted from dealing with new diverse issues of behavioural discipline, emotional maturity and the teenage pregnancy.

The TVET College management is left with a question of how it deals with students' retention. A study to explore the impact of diverse students enrolment to the certification and programme completion rate is essential.

3.10.3 Access to curriculum content for economic participation and social change.

According to Richey (2013), accessibility describes the degree to which a service or product gives students the ability to access functionality. This implies that students must have access to quality content, with relevant learning resources fit for purpose in order to achieve the curriculum set goals.

Furthermore, the interpretation of access has to go beyond merely getting more students "through the door". Therefore support mechanisms to enhance success is crucial (Altbach et al., 2009, p. 45). True progress depends on the levels of completion for all population groups at different levels. This implies that TVET Colleges Management should account for the number of certificated students in their NCV programmes for example the EIC NQF L2-4 to reflect academic achievement, which may open opportunities for employment and articulation to higher education institutions. In addition, an increasingly diverse student body also creates pressure to put in place new systems for academic support and innovative approaches to pedagogy as alluded by South African Principal Organisation (SACPO) in their Summit held in September 2011 as reported by MTT Final Report (2013) and echoed by Ngubane-Mokiwa and Khoza (2016). Furthermore, access to the curriculum implies the removal of curriculum related barriers which may be obstacles to students' acquisition of knowledge, skills and values. Scholars reflect that learners with special educational needs (LSEN) are the main victims of these learning barriers (Cocks & Thoresen, 2013; Malle et al., 2015; Ngubane-Mokiwa & Khoza, 2016). Studies conducted from two African states, Ethiopia and South Africa by Malle et al. (2015) and Ngubane-Mokiwa and Khoza (2016), where focus was on learning barriers to access curriculum content, (trade related subjects and STEM respectively), revealed that access challenges were multi-folded. The barriers to curriculum content access included the inability of management to organise machinery, facilities and equipment that are user friendly to suit LSEN student type of impediments. Also there were no technological assistive devices. Furthermore, there was a lack of general academic support offered to students and the accessibility to buildings were problematic. Similarly, Street et al. (2012, p. 363) label these

bariers as “systematic barriers to participation” . Other barriers were found to be lecturer-development related, namely the lack of realising the importance of developing inclusive teaching strategies (Jensen, McCrary, Krampe, & Cooper, 2004; Lumadi & Maguvhe, 2012). In the South African TVET College context, access to computer laboratories is only allowed for Life Orientation classes and graphic Design subjects which are computer examinable subjects. Furthermore, Life Orientation is a fundamental subject done by all students from NCV L2-4, which makes computer laboratories inaccessible for the ES&C NQF L4 e-learning references. There is a need for a study to investigate how these barriers to curriculum affect the quality of curriculum delivery and students’ retention.

3.10.4 Accessibility and culture

The transition from home to academic school and furthermore, to TVET College is confronted with institutional cultural barriers. The TVET College culture is more about learning to apply the knowledge practically unlike in the school system subjects. Furthermore, the subject jargon, tools, equipment names, the Language of Teaching and Learning, presents new culture. At times it may be difficult for some students to adapt quickly. In addition, this transition to TVET College should result in further smooth transition to the world of work where the culture is also different and demands a lifelong learning learner attitude. Therefore, it is important for the ES&C NQF L4 students to be provided an access to conducive learning and training infrastructure, experienced, and effective lectures who will enhance students success for future participation in the economy.

3.10.5 Access to the world of work for industrial culture acquisition and job placement

Learning through practice is seen as a key factor that has assisted in the transfer of skills, values and competences from generation to generation over the years. According to Billet (2013, p. 127) this “learning through practice has made the most significant contribution to what is encompassed by TVET”. Similarly, Adam et al. (2015) contend that TVET programmes are offered to produce skilled manpower required for the nation’s economic and technological development**.** Therefore, this suggests a need for the formal collaboration between the world of work and TVET Colleges.

In the same line of thinking, the literature reveals that the Chinese government in their endeavours to consolidate the link between industry and VET institutions, have legislated lthe aw to preserve vocational skilled talents. The basic rules or law supporting the cultivation of

skilled talents in vocational education and these rules stress the need to legislate the creation of the bridge between VET institutions and industry. Moreover, according to Jing (2011, p. 74), the rules emphasises importance of the "skilled talents to be market-oriented, employment-targeted, quality-based, and skill-specialised and that the principle of combining learning with working and practicing must be followed"

In the South African context, the Skills Accord was signed between the Industrial Sector, the DHET Minister and Labour to promote floor crossing between colleges and industry for students and lecturers to access work place exposure (Minister Economic Development, 2011). The Skills Acord provided provision for the work based learning (WBL) and work integrated learning (WIL) which seeks to promote access to the world of work. Additionally, it is the responsibility of TVET Colleges to create partnership with industries,in order to form a platform for industrial accessibility. Lecturers' should consider the need to reflect on planning and scheduling the industrial visit without disturbance of their teaching schedules.

3.11 Assessing learning of Electrical Systems and Construction NQF L4

Scholars concur that by definition assessment is a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment (Aranda & Yates, 2009; DBE, 2011, 2014; Khoza, 2015b).

For ES&C NQF L4, assessment is done to establish whether learning and teaching outcomes have been achieved, and thereafter to inform instructional decisions and provide motivation, feedback opportunities, and grading of students. However, from technical skills and values acquisition perspective, assessment is concerned with the attainment of set competences and standards (Van den Akker et al., 2009). By definition, competence is regarded as the "combination of skills, knowledge, attitude, values and abilities that underpin effective and superior performance in a profession/occupational area and context of practice" (Aranda & Yates, 2009, p. 2). Furthermore, assessment in the form of assessment activities (assessment as learning), may provide students guidance to learn the subject matter to achieve the set learning outcomes (Hoadley. & Jansen, 2013; Khoza, 2015b; Stiggins et al., 2005).

Studies reveal that there are different types of assessment that may serve different purposes at different times of the learner knowledge acquisition journey. Matlhaela (2001); Stiggins et al. (2005); Kennedy. et al. (2006); Hoadley. and Jansen (2013) and Khoza (2015b) concur that assessment is classified into: formative, which is assessment for learning and is part of the

learning process while learning is in action. Summative assessment being assessment of learning which summarises the overall performance of each learner, done mainly at the end of the chapter for course marks as well as at the end of the course. Summative assessment leads to the grading of students. The last assessment method is internal continuous assessment (ICASS), defined as "assessment that takes places at intervals throughout the period of learning" (Hoadley. & Jansen, 2013, p. 200). ICASS helps students to develop awareness of their own progress and empowers them to improve future performances . Moreover, for an OBE and dual-content programme like ES&C NQF L4, knowledge of Outcome Based Assessment (OBA) and integrated assessment is essential for lecturers and trainers. Moreover, Matlhaela (2001, p. 215) regards OBA as a "process of collecting and making judgement against agreed-upon standards regarding whether or not assessment criteria have been met". Therefore, to measure knowledge, skills and values demands multi-assessment methods. For knowledge acquired measurement, examination, essays or report tools may be useful for evidence collection. Additionally, for skills (competence), direct observation, submission of product manufactured or the demonstrating practical skill may be enough to make judgement. Measuring values require direct observation, and inter-action with the student may help to produce evidence for judgement.

In addition to the above, NQF principles in relation to assessment must be observed. These include integration, relevance and credibility. Moreover, progression and portability principles must be adhered to (Matlhaela, 2001). While progression from L2 to L4 has been achieved, the portability of practical skills is not transferable due to the lack of unit credits and furthermore tasks completed by the students are not registered in the National Learner Data-base. The challenge at TVET College is the students' enrolment numbers and time allocation spread across theory and practical. Lecturers' reflections on how integrated assessment is done on the ES&C NQF L4 dual-content, may assist the lecturers to master the outcome- based assessment thus improve the throughput quality.

In the context of ES&C NQF L4, an assessment framework is provided, which is comprised of internal continuous assessment (ICASS), the external summative assessment (ESASS) and integrated summative assessment task (ISAT) for the practical component. The ICASS and ISAT marks are compulsory for a student to be certificated. Furthermore, grading or progression is determined by student meeting of the ISAT, ICASS requirement criteria and then passing the ESASS (external examination). All assessment records are kept in the student portfolio of evidence for moderation. Assessment is a major component of curriculum and

therefore, the entire assessment system is moderated for trustworthiness. For the ES&C NQF L4, DHET ES&C L4 AG (2015) stipulates that the assessment must be conducted by a competent person responsible for signing all assessment documents submitted by the facilitators and instructors. Furthermore, the assessment system and students' scripts must be moderated internally and externally. The absence of industrial standards and a relevant quality assurance body for the core subject practical is a main concern which was raised by different scholars. The Table 3.3 and Table 3.4 below show the number of ICASS per year that the student must do and the competence achievement scale

Table 3.3 ICASS and the ISAT quantity to be done per year

SUBJECT	TERM1	TERM 2	TERM 3	TERM 4	TOTAL
ES&C NQF L4 (ICASS)	2	2	1		5
PRACTICAL			ISAT		

(This table is taken from ES &C NQF L4 Assessment guidelines 2015)

Table 3.4 Competence of achievement Scale for ES&C NQF L4 based on the level descriptors

RATING CODE	RATING	MARKS%
5	Outstanding	80-100
4	Highly competent	70-79
3	Competent	50-69
2	Not yet competent	40-49
1	Not achieved	0-39

(Taken from ES&C NQF L4 Assessment guidelines 2015**)**

3.12 Literature review (conceptual framework) chapter concluding statement

This chapter presented views of international and local scholars who shared their experiences and knowledge on curriculum implementation issues. In line with the above, curriculum learning signals (Khoza, 2015c; Van den Akker et al., 2009) was used to frame the curriculum concepts to help lecturers comprehend the broader curriculum components. Moreover, issues of rationale/vision/reason, goals, accessibility, lecturer roles, content (dual-content), learning activities, learning resources, learning location, time and assessment appeared to be critical components to be understood by lecturers for effective curriculum implementation as practiced by lecturers at Micro-level. Moreover, chapter two presentd challenges related to curriculum dissemination and the proper introduction of curriculum change (OBE). Furthermore, the literature presented curriculum implementation challenges associated with dual-content and

learning resources which destabilises the intended outcomes resulting to undesirable throughput. Areas of further research from this chapter were identified namely: Learning and teaching resources scarcity a recipt for poor throughput and threat to the Master Plan, what can be done?. and the Access barriers to learning (LSEN students) and learner entry qualifications diversity resulting to students drop-outs. Implications to funding, and certification completion rate. These research concerns will be validated by the researched participants and thereafter recommendations made.

Therefore, the literature theoretical background will provide the researcher with valuable information and guidance at knowing how the intended, implemented/practiced and attained curriculum are synchronised at Micro-level. Moving forward, the next chapter will present the research design and methodology (Study Archtectural Plan and Technique) to answer the research questions as positioned by research objectives.

CHAPTER 4

STUDY ARCHITECTURAL PLAN AND TECHNIQUE

4.1 Introduction

This chapter starts by presenting the views of scholars through describing and defining the research design, methodology plus the function of research design. In line with the above, Christiansen (2010) defines the research design as logical sequence that relates to empirical data generation to fulfil the project's research objectives. Hakim (2005) describes research design as the systematic chronological step-by-step pattern in which a particular research is aimed to be worked out. Furthermore, De Vaus (2001) opines that the function of research design is to ensure that the evidence gained allows the researcher to address the research problem clearly and precisely. According to Fei (2015 p. 567), methodology can be defined as a "general research paradigm that summarises how research project is to be carried out and identifies the detailed process to be employed". Furthermore, Fei (2015) posits that the research methods include the research design, paradigm, sampling, devices/instruments or approaches for data generation and results analysis. In summary, the research design articulates what data is required, methods to be used to generate data and data analyses considering how the design will respond to research objectives and questions.

In line with the above, the previous chapters (Literature review) focused on lecturers' reflections, curriculum models and related issues, the developmental state and implications to TVET College. In addition, the literature review presented the Supra, Macro and Micro scholarly views of the topics mentioned above and lastly the ten curriculum learning signals (conceptual framework. Therefore, the current chapter (Research Design & Methodology) seek to present the research questions and objectives aimed at guiding the research design and methodology

4.2 The objectives and questions of the study are:

- Explore the reflections of the lectures who are teaching theory and practical in the Electrical Systems and Construction (ES&C) NQFL4 NCV programme at TVET College campuses in KZN

- Understand reasons that inform the lecturers' reflections of the teaching of Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN

- Explain the lessons that can be learned from the lecturers' reflections of the teaching of the Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN

The above objectives will be achieved through addressing the following research questions:

- What are the lectures' reflections of the teaching of ES&C NQF4 NCV curriculum at TVET College campuses?
- What informs lecturers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses? (Why these reflections?)
- What lessons can be learned from the teachers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses?

Furthermore, the current chapter intends to present the research approach (qualitative), research style (case study), research paradigm (interpretative), sampling (purposive and convenience), data generation methods (reflection activity, semi-structured interviews and group discussion), trustworthiness/authenticity (credibility, dependability, transferability, confirmability), data analysis (guided analysis), ethical issues and study limitations. However, to achieve the above, a research design flow chart is presented to frame the themes sequentiall

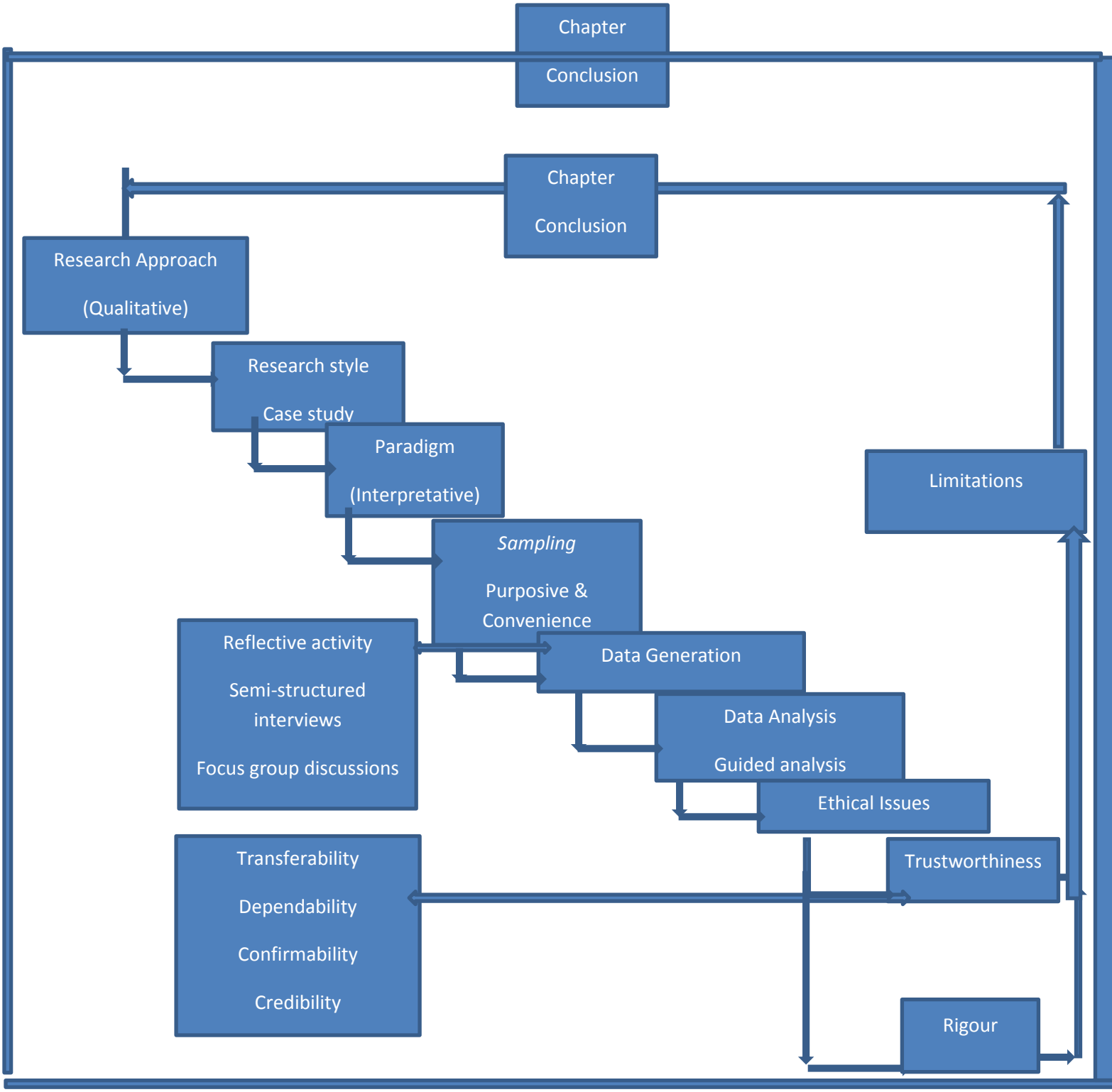

Figure 4.1 Research Design and Methodology Flow Chart

4.3 Methodology Paradigm Research approach

Denzin and Lincoln (2000); Ary et al. (2006); Gibbs (2007); Martens (2010); Christiansen et al. (2010); Cohen. et al. (2011); and Govender (2012) concur that qualitative inquiry seeks to understand and interpret human and social behaviour as it is lived by participants in a particular social setting. In line with the above, Maree (2010) contents that, the research questions seek to understand the participants' experiences with the central phenomenon (Lecturers reflection's of the teaching of ES&C NQF L4 NCV curriculum at TVET College campus). Moreover, Creswell (2012b) asserts that qualitative research is more descriptive, holistic, explorative and contextual in its design and aims to produce rich description of investigated phenomenon. In addition to that, Cohen et al. (2000a) aver that qualitative approach research findings cannot be generalised but may be transferable to similar context and therefore for this study, lecturers' chosen (participants) are all from Electrical Infrastructure Construction NQF L2-4 NCV (OBE) curriculum, thus teaching core electrical subjects. The seven chosen lecturers reflected on the ten learning signals based on curricular-spider web in their teaching of ES&C NQF L2-4 and other IEC subjects. Therefore, the research findings are transferable to all seven lecturers as well as to other lecturers exposed to the similar environments and contexts. In line with the above, this study seeks to explore and understand lecturers' reflections of the teaching of ES&C NQF L4 NCV curriculum dual-content which is confronted by curriculum implementation challenges at Micro-level. By virtue of qualitative research being textual, explorative, its design provides the participants an opportunity to tell their story. In additional, qualitative research resulted in this study adopting the qualitative approach, making the qualitative research approach a preferred model for this study.

Qualitative researchers rely on multiple data source which they collect themselves through examining documents and observing behaviour or interviews rather than rely on a single source data as the case with quantitative research. Furthermore, "they do not tend to use or rely on questionnaires or instruments developed by other researchers" (Creswell, 2009, p. 176). However, they develop own tools guided by qualitative principles, current situations and the need to hear the voice of the researched.

Furthermore, Creswell (2009) opines that the researchers' interpretations of the findings cannot be separated from their own backgrounds, history, context and prior understanding and these researchers are open about this which makes it very subjective**.** In the same line of thinking, Fei (2015) contends that qualitative research is better positioned for exposing fresh issues but

according to Rich (2012) this may need the researcher to ensure that participants equally provide fresh and relevant data through the researcher asking stimulating questions. In support of the ideas presented, Creswell (2012b) is of the opinion that qualitative research can assist the study to establish deeper meaning of the participants understanding of the phenomenon, in this context the lecturer's reflection of the teaching of ES&C NQF L4 NCV L4 curriculum. By virtue of vigorous interaction between role players this may promote teaching awareness which may result to critical thinking (Khoza, 2015c). However, Fei (2015); Check and Schutt (2012), opine that the most commonly used qualitative research methods include case study, action research, and ethnography research. This study employed case study as the research tool.

4.4 Research style (Case study)

Yin (1984, p. 23) and Fei (2015) concur that case study can be defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used." Stake (1995) and Ally (2004) regard case study as a systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest. However, Ary et al. (2006) and Cohen et al. (2007) aver that case studies are employed when a researcher needs to generate data and furthermore, inform and provide others with an in-depth presentation of events. On the basies of the above background, it became crucial for this study to adopt the case study approach in order to achieve the objectives of the study, specifically to explore and understand the phenomenon (lecturers' reflections of the teaching of ES&C NQF L4 NCV curriculum at a TVET College).

Case studies are meant to provide an in-depth description of a single unit where the unit may be an individual, a group, a site, a class, a programme, an institution or a particular community (Gulsecen & Kubat, 2006; Johnson, 2006; Zaidah, 2007). Moreover, this is a single occurrence of what the researcher is interested in investigating (Ary et al., 2006; Cohen et al., 2007). Yin (1984) notes that categories of case studies are exploratory, descriptive, critical instances, illustrative and explanatory. For this study, a combination of exploratory, and critical instance were used as it is relevant to the objectives of the study which is to explore and understand the phenomenon (that is to understand lecturers' behaviour and their concerns towards teaching ES&C NQF L4 so that lecturers may use the findings of this study to deal with their concerns and ensure quality teaching). Like many approaches used to improve knowledge accumulation

and preservation, case studies methods have merits and demerits which are presented below and supported by respective scholars.

Some of the merits are that the examination of the data are often conducted within the context of its use (Yin, 1984), that is, within the situation in which the activity takes place. Furthermore, variations in terms of intrinsic, instrumental and collective approaches to case studies allow for both quantitative and qualitative analyses of the data. This implies that some case studies seek evidence from both numerical and categorical responses of individuals. In addition, the detailed qualitative accounts produced in case studies donot only help to explore or describe the data in the real-life environment, but also help to explain the complexities of real-life situations which may not be captured through experimental or survey research (Zaidah, 2007). However, despite the mentioned merits, the following demerits needs to be recognised.

Case studies are often accused of a lack of rigour. Yin (1984, p. 21) alludes that, "too many times, the case study investigator has been sloppy, and has allowed equivocal evidence or biased views to influence the direction of the findings and conclusions". In addition, it provides very little basis for scientific generalisation since they use a small number of subjects, some conducted with only one subject. The question commonly raised is, "How can you generalise from a single case?" (Yin, 1984, p. 21). A common criticism of case study method is its dependency on a single case exploration making it difficult to reach a generalising conclusion (Tellis, 1997). However, qualitative researcher recognise and admit that the nature of research is subjective and open to the researcher being biased. However, for this study, to eliminate biasness, participants are quoted verbatim and the final report content has their endorsement for conformity and trustworthiness. Beyond the case study as a research tool, the researcher needs a paradigm as a guide on his/her investigation.

4.5 Qualitative Research Paradigms (Metacognition Paradigm)

According to Guba and Lincoln (1994, p. 105), the paradigm can be defined as the "basic belief system or world view that guides the investigator". Furthermore, Collins and Hussey (2009) further outlines that a research paradigm is a reflection of a set of principles or beliefs about the nature of the world, including what to be known and how we can know and understand it better. Similarly, Bless and Achola (1990); Brown and Dowling (1998), and Christiansen et al. (2010) share the same view in describing a research paradigm because they hold the view that research paradigms represent a particular world view that defines a researcher. In line with the above, Creswell (2009); Cohen. et al. (2011) believe that it is important for each study to define

its research paradigm because the way we see the world influences the way we research the world. However, studies from Christiansen et al. (2010); McGregory and Murnane (2010); Creswell (2009); Hakim (2005); Myers and Avison (2002) and De Vaus (2001) opine that there are three main research paradigms and these are: post- positivist, the interpretive and critical paradigms and in addition, Goldkuhl (2012) maintains that pragmatism should be added as a member of the qualitative research paradigms. According to Braa and VIidgen (1999) and Cohen. et al. (2011) post-positivists endeavour for predictability, objectivity, patterning, and the construction of laws and rules of behaviour. Then again, the interpretive paradigm aim to understand and interpret the world in terms of its role players, but then the critical paradigm acknowledges the political and ideological context in order to make transformation. Additionally, the pragmatism aims for intervention and change. Pragmatism is of the view that the world is changed through reason and action and furthermore, there is an inseparable connection between human knowing and human action (Goldkuhl, 2012; McGregory & Murnane, 2010). In the context of this study, human knowing can be described as facts presented by the scholars on the phenomenon combined with the opinions of the society (participants) on the researched topic, resulting to the corrective action plan (human-action) guided by the research findings and recommendations representing the voice of the researcher informed by his/her personal reasons.

However, Cohen et al. (2007); Creswell (2009); Bertram and Christiansen (2014) opine that case studies mentioned above, are research styles that are commonly used by researchers in the interpretivist paradigm, therefore this study is framed in the interpretive paradigm as well.

4.6 Interpretative Paradigm (metacognition)

Qualitative methods are usually supported by interpretivist because the interpretive paradigm "portrays a world in which reality is socially constructed, complex, and ever-changing" (Thomas, 2003, p. 6). Furthermore, Thanh and Thanh (2015, p. 26) posit that the interpretivist researchers seek methods that enable them to "understand in-depth the relationship of human beings to their environment and the part those people play in creating the social fabric of which they are part". The rational for this study is to explore and understand the lectures' reflections which is positioned by the study objectives and research questions. In line with the above, the interpretive paradigm researchers are not apologetic for being subjective as they hold the view that the social world is subjectively constructed and given meaning. However for this study, the researcher strives to manage biasness in order to obtain credibility as per the advice from

McMillan and Schumacher (2010). Furthermore, it needs to be noted that the interpretative paradigm has no transformational agenda but seeks to support human knowing agenda which may ultimately empower those entrusted with power to make interventional changes based on informed decisions. This study is conducted to understand the lecturers' perspectives about their environment (Micro-level) as well as their curriculum related challenges. Framing the research project in an interpretive paradigm can yield positive results due to the following:

The researcher by virtue of being at close proximity to the researched settings and interacting with participants is privy to the real situation with first-hand information to generate data (Cohen. et al., 2011). Moreover, the data consists of words which the majority of people can easily understand to construct meanings while quantitative data consists of numbers which at times is complex (Maree, 2010). Therefore, on the basis of the above advantages, interpretative paradigm is adopted for this study.

However, weaknesses need to be noted so that a proper mitigation plan is made to circumvent such short-comings. According to Cohen, Manion, and Morrison (2000b) interpretative paradigm research findings are seen to be merely a collection of personal opinions subject to researcher biasness. Further, Creswell (2012a) posits that the researcher is likely to be subjective and can lead participants towards his/her predetermined direction thus distorting the reality. Furthermore, Cohen, Manion, and Morrison (2011) assert that textual data is not measurable. In order to circumvent the weaknesses mentioned above, for this study the data was recorded accurately minimising the researcher's words by quoting participants verbatim. Going forward, the success of any research is unlikely to take place in the absence of a research sampling therefore the next topic presents the sampling.

4.7 Sampling: Purposive and Convenience

Scholars have different viewpoints regarding the description of sampling but Cohen. et al. (2011);Bertram (2010) and Christiansen et al. (2010) regard sampling as a process of making decisions about people, setting, events and, behaviours to observe or study. Similarly, Lantham (2007) describes sampling as a subgroup of a population. On the same breath, Kerlinger (1964) and Maree (2007) posit that sampling is done purposefully, specifically to create a representative and manageable number of participants for research. For qualitative investigation, it may be difficult if not impossible to use the entire population for research sampling in order to obtain required information, (qualitative is a partipants selected model not the entire nation) and reasons for such difficulties may be among other things the financial

expenses, accessibility of relevant participants and time. Furthermore, Cohen. et al. (2011) maintain that the disadvantage of convenience sampling is the choosing of participants who don't represent the entire population and moreover, the findings can't be generalised. A small group or part of the population may be used to represent such population or group and therefore this group represents itself and therefore, the study findings can only be transferred to environment and settings similar to subjects and the phenomena chosen. Studies reveal that there are various methods of sampling in educational research and these methods include probability sampling and non-probability sampling. Random stratified sampling, cluster sampling, stage sampling and multi-phase sampling fall under probability sampling. The non-probability samples include convenience sampling, quota sampling and purposive sampling (Cohen. et al., 2011). However, this study is interpretative and therefore did not need a broader population nor intentions to generalise. Therefore it was possible to use a non-probability sampling, in this regard a purposive and convenience sampling.

In line with the above, Etikan, Musa, and Alkassim (2016); Cohen. et al. (2011); Cohen et al. (2007) and Maree (2007) are agreeable that purposive sampling is part of the qualitative research family where the researcher is at liberty and privileged to select participants based on their availability and relevance for the study thus minimising the selection of a broader community. However, for this study, lecturers were chosen based on their service-years of teaching the Electrical Infrastructure Construction (EIC) NCV curriculum subjects which are: Electrical Principles Practice (EPP), Electrical Workmanship (EW), Electrical Systems and Construction (ES&C), Electronic Control and Digital Electronics (EC&DE) and Electrical Workshop Practice (EWP) and furthermore, their dual-content subject knowledge and experience at the TVET College settings. For this study, seven participants chosen came from two campuses. One campus is from a TVET College Campus that specialises in the electrical field that offers both National Certificate (Vocational) NQF L2-4 (OBE driven and student-centred) and Report 191 (N1-6) which is a lecturer- centred and vertical in design. This campus is located in an urban area (Umgungundlove District). The other campus is a multi-purpose campus situated in a rural environment (Ugu District). The two campuses are 235km apart resulting in financial and time constraints. In addition to the above, the Table below presents the participants profile.

Research Participants profile (Table 4.1)

Participant	Gender	Qualification	Teaching Experience	Programme	Subject	NQF Level	Student Numbers	Race
P1	M	BEd + Electrician	11 years & 7 years Ind.	E.I.C	EWP	3&4	32	Coloured
P2	M	NPDE & N-Diploma	15 years & 10 years Industrial	E.I.C	ES&C	2;3&4	32	Indian
P3	M	BEd & Electrician	5 years	E.I.C	EPP	2&3	32	Indian
P4	M	NPDE & N-Diploma	14 years & 6 years Ind	E.I.C	EW	3&4	32	Indian
P5	M	BEd +N-Diploma Electrical	10 yrsears & 11 years Industrial	E.I.C	ES&C	2-4	18	African
P6	M	National Diploma Electrical Eng – HC NPDE	4 years & 5 years Industrial	E.I.C	ES&C	2-4	18	African
P7	M	NPDE; National Eng-Diploma (LC) +N6	9 years & 16years Industrial	I.E.C	EC&DE	2-4	32	Indian

The above listed lecturers are directly responsible for the implementation of the intended curriculum at Micro-level therefore partly responsible for the attainment of curriculum goals. The participants have taught both programmes and are versatile in delivering theory and practical in all Electrical Infrastructure Construction NQF L2-4 subjects making them preferred candidates for this study. Moreover, their teaching experience and academic inclination gives hope that their reflections will assist in generating quality data for this study. Therefore, I choose the seven available participants who voluntarily wanted to be part of the study being equally aware that the sampling group represents itself and the study outcomes cannot be generalised. However, it is able to be transferred to similar conditions (Christiansen et al., 2010; Cohen. et al., 2011; Lantham, 2007).

According to Córdova et al. (1995); Hippach-Schneider et al. (2007);Lipsmeier (2013) and Grijpstra et al. (2015a), who conducted studies from five EU countries, four African countries, Vietnam and Oceano countries on TVET College, revealed that commonly found types of teachers responsible for curriculum enactment/implementation at Micro-level, are theory only teachers, practical training teachers, instructors combination of theory and practical. In line with the above, the selected participants (lecturers) are a combination of the theory and

practical and this is evident in their qualifications presented on the lecturer's profile Table 4.1 content. Therefore, let me elaborate further on the individual participant selected for this study to justify their nomination purposefully and conveniently.

The researcher acknowledges that this sample appear not sensitive to woman inclusivity. The sample was meant to be both racial and gender sensitive but the researcher could not get female participants who met the participants selection criteria for the Electrical Engineering programme which have history of being dominated by males at both Coporate World and TVET College Sector. The researcher also did not want to compromise the anticipated quality of input for this study, however, in future the researcher will exhaust all possibilities to comply to the demographics and inclusivity principles.

P1 candidate is a Section 28 trade tested electrical artisan (Electrician) with a vast knowledge of industrial, teaching, and training experience. Furthermore, this participant holds a Bachelor of Education qualification. On the point of being relevant for this project, he is part of the Electrical Infrastructure Construction NCV curriculum programme team, facilitating the Workshop Practice NQF L 2-3 dual-content. Apart from the above, he was part of the TVET College tem who visited Denmark for three weeks on an exchange educational mission to explore Programmable Logic Controls design and applications.

P2 candidate is a Section 13 trade tested Electrical Artisan with the National Technical Diploma, furthermore, he holds the NPDE teaching qualification. He previously owned a construction company, worked at different companies before joining the TVET College and his service years listed on the participants list profile speaks volume about his teaching and industrial experience. Candidate P2 is responsible for the facilitation of the Electrical Systems and Construction NQF L2-4.

Candidate P3 is also a Section 13 trade tested Electrical Artisan, studying a Bachelor of Education (BEd) qualification. He worked at different industries before joining the TVET College where he has spent five years in the Electrical Infrastructure Construction (EIC) NCV curriculum teaching the Electrical Principles and Practice (EPP) NQF L2-4 dual-content subject. Candidate P4 is a Section 13 trade tested Electrical Artisan with National Diploma (Electrical) who further registered and completed NPDE educational qualification. P4 was also part of the delegation from his college sent to Denmark to learn Programmable, Logic Controls (PLC) for three weeks on an educational exchange programme. Furthermore, he has teaching service of fourteen years at this TVET College. Candidate P5 is a Section 13 artisan, with BEd,

National Diploma (Electrical-Lift technician), eleven years' of industrial experience and ten years teaching at a technical college environment. He has been involved in dual-content from NQF L2-4 teaching ES&C elective dual–content subject. Candidate P6 is a Section 28 electrician, and holds a Technician Electrical Diploma (HC) plus the NPDE teaching qualification. Furthermore, he has five years' industrial experience and four years teaching the dual-content at this TVET College campus. Candidate P7 holds a Technicians Electrical Diploma in Light Current (LC), N6-Diploma with 16years industrial experience and furthermore a NPDE teaching qualification plus the assessor, facilitator and moderator certificates. He is part of I.E.C teaching Electronics Control and Digital Electronics NQF L2-4 having spent nine years of teaching at a TVET College to date.

The seven chosen participants (7) possess industrial experience, technical and academic qualifications in the teaching of Electrical Infrastructure Construction NCV curriculum and their participation in the project is hoped to provide data which responds favourable to the research objectives and questions. In addition to the above, Cohen. et al. (2011) contend that purposive sampling provides greater depth and focus on people with rich information on the project subject. Furthermore, with reference to the participants' profile table, qualifications and teaching experience variation possessed by the participants gave me an opportunity to record different reflections as they shared their experiences in the teaching of Electrical Infrastructure Construction core subjects and ES&C NQF L2-4 NCV curriculum. However, what I acknowledge was the possibility of bias from the side of the researcher which I managed to avoid by quoting participants verbatim. I hope the participants' reflections of their teaching of the Electrical Infrastructure Construction subjects (ES&C NQF L4) add value and insight at how curriculum is practiced at their delivery site. This study mission cannot be achieved if data generation methods are excluded and therefore, the following psection presents the data generation methods.

4.8 Data generation methods

Bertram and Christiansen (2014) contend that data are the facts that the researcher produces/generates to find answers aimed at responding to research objectives and questions. Furthermore, data can be generated through the application of multi-modes of inquiry (Bertram & Christiansen, 2014; Cohen et al., 2007; Cooper & Schindler, 2011; Fei, 2015; Thomas, Nelson, & Silverman, 2011.). Moreover, Schultz (2005) opines that multiple modes of inquiry provide for the use of multiple theoretical lenses and methodologies for data generation and

analysis to gain richer understanding of the essence of the experience and the phenomena being investigated. Therefore, in line with the above, this project adopts the three techniques for data generation namely an open ended questionnaire for participants' reflective activity; one-on-one semi-structured interviews, and focus group discussion. In additional to that, observation and documents analysis are adopted to obtain further clarity on curriculum issues related to implementation/practiced at Micro-level. Before data could be generated from participants, the consent letter was issued to participants and the content discussed. Thereafter, the participants' declaration was also issued, and participants requested to sign the declaration (for ethical reasons) which the researcher had to collect when he came to fetch the reflective activity or open- ended questionnaire.

4.8.1 Open-ended questionnaire (Reflective activity)

Studies by Cohen. et al. (2011) and Valli (2009) describe the (Teacher Reflection Activity) as a written activity that asks lecturers to complete a short series of questions about the phenomenon studied. Furthermore, characteristics of the qualitative research reveals that participants are likely to describe a phenomenon (Lecturers' reflections in the teaching of ES&C NQF L4 NCV curriculum) with words, rather than with numbers (Bogdan & Biklen, 2007; Creswell, 2009; Ivankova et al., 2007; Jones & Kottler, 2006; Kumar, 2011; Leedy & Ormrod, 2010; Willis, 2008). Therefore, for this study, I chose the open-ended questionnaire (reflective activity) as the first method to offer the participants an opportunity to reflect through responding to the curriculum conceptual framework (Learning signals) as positioned by Khoza (2015c) and Berkvens. et al. (2014) (Chapter Three). This implies that participants are to reflect at their practices, educational goals, dual-content, rationale for teaching, TVET College campus organisation and culture, teaching-learning environment, time allocation, accessibility, learning activities and the assessment of the ES&C NQF L4 NCV curriculum. However**,** the open- ended questionnaire has demerits which includes: More diverse answers generated thus needing extensive coding (Payne, 1980; Sheatsley, 1983; Sudman & Bradburn, 1991). Furthermore, there are larger items of non-responsive hence more data missing (Bailey, 1987). In addition, probing is not possible in an open-ended questionnaire. Furthermore, because of the unobserved process of data generation, it is not known whether participants understand and follow the given instructions. To mitigate the stated demerits, I used the face-to-face semi-structured interviews as a follow up tool and created the opportunity for the participants to get clarity through inter-actions. Moreover, the semi-structured interviews also gave me the opportunity to probe participants.

Therefore, the Table 4.2 below presents the reflective activity for lectures to reflect on questions.

Reflective Activity Guiding Tool for Participants –Open-Ended Questionnaire

Table 4.2: (Reflective activity guiding tool)

	This Reflective Activity is for reflections of your teaching of ES&C NQF L4 NCV curriculum. You may use various sources to complete this activity. Present your reflections by following the curricular learning signals (based on curriculum concepts) questions presented below.	
CURRICULUM CONCEPTS	**QUESTIONS DIRECTED TO LECTURERS**	**Problem: Lack of link between curriculum levels- intended; practiced; and achieved**
		Reflect on the practiced curriculum of the teaching of ES&C NQF L4 and consider NCV Policy 2006 purpose (p 83 (1)(3) Use the space below to reflect your experience in curriculum practice.
Rationale	Why are you teaching (Rationale/visions) ES&C NQF L4 NCV curriculum? Respond on: • Personal reasons • Professional reasons • Societal reasons	
Accessibility	How do students access the learning of ES&C NQF L4 NCV curriculum? Respond on: • Physically; • Financially • Culturally.	
Goals	Towards which goals are you teaching ES&C NQF L4 curriculum? Respond on: • Aims, • Objectives, • Outcomes	
Content	What content are you teaching in ES&C NQF L4 curriculum? What is the practical training guide content of your training of ES&C NQF L4 NCV curriculum? Respond on: • Topics • Practical modules/Projects • Practical guide content • Subject knowledge	

Teacher role	How do you perceive your role as an ES&C NQF L4 lecturer? Respond on: • Teacher-centred (instructor) • Learner-centred(facilitator) • Content-centred approach(assessor)	
Teaching activities	Which activities are you using to teach and train ES&C NQF L4 curriculum? Respond on: • Informal assessment task • Formal assessment task • Formal learning activities • Practical module training • Supporting tasks	
Learning Resources	What resources are you using to teach ES&C NQF L4 curriculum? How do learning facilities cope with learner: trainer: facilities ratios and what impact it has on product quality? Respond on: • Hard-ware • Soft-ware • Ideological-ware	
Learning Location & Time	Where and when are you teaching ES&C NQF L4 and what is your training workshop accreditation status? Respond on: Location • Workshop • Classroom • Computer laboratories Time Hours and Days	
Assessment and Quality Assurance	How are you assessing learners in ES&C NQF L4 NCV curriculum and who quality assures theory and practical? Respond on: • Formative assessment • Summative assessment • Continuous assessment (CASS) • Integrated summative assessment • External summative assessment (ESASS)	

	How do you manage portability and credibility of skills acquired by learners?	

4.8.1.1 Expected responses from participants (Lecturers) as they reflected on curricular concepts based on Reflective activity exercise.

In question one, lecturers (participants) were expected to reflect on what motivated them to teach ES&C NQF L4 NCV curriculum. Their responses had to consider personal, societal and professional reasons as per the framing of Berkvens. et al. (2014) and Van den Akker et al. (2009). This implies that the expression that shows enthusiasm passion for teaching, and the drive to see students as individuals being better people for future represents personal reason. Furthermore, expressions that show inclination towards community involvement including socio dynamics motives to influence interest of the teaching of the programme (EIC) or subject (ES&C NQF L4) is a societal reason. However, any articulation based on choice of teaching career supported by programme (Artisan or Technical Diploma/Degree) or subject knowledge, qualifications, and other relevant studies is perceived as professional reasons.

Moreover, in question two lecturers were expected to respond on accessibility which is divided into physical access; financial access and cultural access and the question was directed at who is being taught and how the students access the programme/ subject. Physical access is directed at students' accommodation and transportation means to reach the TVET College campus. Financial access is directed to who funds the student to access the curriculum. Cultural access is directed to issues like sport, political, religious, social ethnicity,and diversity impacting on teaching/learning.

Furthermore, question three requested lecturers to respond on their educational goals, focusing on aims, objectives, and outcomes. Lecturers were expected to describe aims as long-term goal known to be broader statements that the lecturer intends to cover (futuristic plan) while objectives is a short-term goal closer to the lecturers and what they intend to do as they practice their trade, is commonly associated with the performance curriculum (Khoza., 2013b). For the outcomes, lecturers are expected to state that outcomes are associated with OBE driven curriculum, and furthermore, outcomes are classified into subject outcomes; learning outcomes (statements the learner should achieve at the end of the lesson); critical outcomes and developmental outcomes.

Question four required the lecturers to respond on what content they are teaching the students considering that ES&C NQF L4 is a dual-content subject. Their responses are expected to be based on lesson topic taught, subject knowledge and practical/project module facilitating.
Furthermore, question five required lecturers to respond on how they perceive their roles in the teaching of ES&C NQF L4 NCV curriculum. Lecturers were expected to base their responses on the teaching approach adopted namely teacher-centred (instructor); learner-centred (facilitator) and content-centred (assessor). In a student -centred approach, the lecturer facilitates learning while in a teacher-centred approach he/she is an instructor. In cases where prescribed content is taught, the lecturer becomes an assessor.
The sixth question required lecturers to account on the learning activities issued to students. Their responses were expected to cover formal assessment task, informal assessment task, practical module training, formal learning activities and supporting tasks. Expected responses were the following:

- Informal assessment task - assessment for learning process activities conducted by peer group or individual student aimed to establish whether outcomes have been achieved which is provided by the student guide at the end of each topic.
- Formal assessment task – is done to provide articulation opportunities for students further learning or grading. These include summative assessment, integrated summative assessment (ISAT), and external summative assessment.
- Formal learning activities – are institutionalised, intentional, structured following a ladder and may take place at the college where end results may lead to an achievement award in a formal NQF registered qualification. In the context of ES&C NQF L4 subject, the entire subject learning activities taught to prepare the students for external examination readiness.
- Practical module training–learning activities involving practical component of the dual -content to equip students with practical know how.
- Supporting tasks – additional tasks associated with remedial work given to students namely homework or web-page references for further learning to enhance their knowledge.

Question seven required the lecturers to mention resources they use to facilitate dual-content ES&C NQF L4 subject. Their responses needed to cover hardware-resources – tools, machinery, and equipment; software- resources. information carrier like compact disc, DVD

or any information display content used in conjunction with the hard-ware and ideological-ware resources -teaching approaches. Furthermore, lecturers were asked how the resources coped with students: trainer: facilities ratio and what impact this had on product quality. In the latter sub-question, lecturers were expected to mention their current enrolment norm per class per lecturer and further explain the facilities loading capacity and challenges thereof.
Question eight required the lecturers to reflect on where and when they conducted teaching of a dual-content subject the ES&C NQF L4 NCV curriculum. Furthermore, they were asked to explain the accreditation status of the workshop used for training. Responses expected from lecturers were the venues for the dual-content namely classroom, workshop, computer laboratory or simulation plant. The when (time) is the time distribution between theory and practical based on 40:60 rule and lastly to mention the accreditation status of the workshop used for training taking into account the standardisation, quality training and industry (employer) confidence of produced product.

Question nine required the lecturers to reflect on how students are assessed in ES&C NQF L4 NCV curriculum and furthermore who quality assures theory and practical. Lecturers are expected to reflect guided by the following propositions:

- Formative assessment – assessment for learning and these includes informal tests
- Summative assessment – assessment of learning involving control test for year mark purposes
- Internal continuous assessment (ICASS) – means to evaluate progress in student's comprehension of the content learned and appropriate remedial taken to correct the situation.
- Integrated summative assessment (ISAT) –Final practical assessment tool set externally for students' practical examination. Lecturers are to reflect on how they manage numbers against resources.
- External summative assessment (ESASS) – Final external examination for student progression

The next sub question is: How do you manage portability and credibility of skills acquired by learners? Lecturers are to reflect on how the NCV skills acquired by students is carried forward based on the tasks recorded on the formal certificate. On credibility, the lecturer is expected to explain the entire training process, accreditation of facilities and the instructor's credentials

plus the quality assurance body responsible and these are the ingredients of the credibility of the qualification.

Two weeks was given to participants (lecturers) for them to reflect in writing their practiced experiences through answering the Reflective activity semi-structured questionaire questions based on the curricular spider-web concepts. Furthermore, the reflective activity tool did provide a problem statement which I hope would assist lecturers in contextualising the questions. An assumption made is that lecturers were going to be professional in their handling of the questions as they reflected, and I committed to be available telephonically to provide clarity on questions that arose in the answering of questions. Moreover, an arrangement was made to meet weeks later after collecting the reflective activity responses from the participants in order to conduct one –to-one semi-structured interview for in-depth and holistic data generation.

4.8.2 Face-to-face semi-structured interviews

Studies encourage the use of multi- inquiry methods in order to enhance the quality and the depth of data generated (see section 4.8) and therefore for this study, one-on-one semi-structured interviews (for in-depth interviews) were adopted as a second method for data generation using the same questioning tool used in method one (reflective activity open- ended questionnaire). Furthermore, semi-structured interviews allow for probing and clarifications of answers and usually requires participants to answer pre-determined questions (Bridges et al., 2008; David & Sutton, 2004; Holloway. & Wheeler, 2010; Maree, 2007)**.**

According to Kvale (1983, p. 174), the qualitative research interview is defined as "an interview, whose purpose is to gather description of the life-world of the interviewee with respect to interpretation of the meaning of the described phenomena", namely the lecturers' reflections of the teaching of ES&C NQF L4 at a TVET College. However, the above definition is in line with the definition of the semi-structured interviews which according to Bertram and Christiansen (2014); Cohen. et al. (2011); McMillan and Schumacher (2010) and Harrell and Bradley (2009), is a structured conversation where the researcher has certain expectations of answers he/she wants from the participants as dictated by a set of predetermined specific questions.

Furthermore, Gill, Stewart, Treasure, and Chadwick (2008), and Opdenakker (2006) concur that interviews provide deeper understandings of the social phenomena, moreover, social cues,

such as voice, intonation, and abody language of the interviewee can give the interviewer a lot of extra information that can be added to the verbal answer of the interviewee. Based on the above, I found the face-to-face semi-structured interview appropriate and relevant for this study as it allowed participants to give more detailed responses. Therefore, to set the tonne, I requested participants present their academic profile and practising experience in the teaching of ES&C NQF L4 prior to any probing of the reflective activity responses. Moreover, I found the mentioned practice to be balancing the situational knowledge and harmonising of the research space as suggested by Mikecz (2012) and Phillips (1998). In addition to this, I noted that the face- to- face semi-structured interviews platform is a psychological power contested space between the researcher (who is a prober, programme director deciding what questions to be asked) and the participants (source of the researched knowledge) and therefore this results in psyche power and emotions contestation (Edwards & Holland, 2013). In this context, indirect negotiations between the two parties is essential. For this study, the researcher made sure the space of the participant is respected and he probed for clarity after the participant finished his sharing and the number of probes depended on clarity needed. Furthermore, he used the audio recorder and scribed the notes presented by the participants. The recorded information helped me to quote the participants verbatim. The face-to-face interviews approach presented some challenges for this project.

Shortcoming of face-to-face interview is that it is time consuming and expensive (Opdenakker, 2006; Rabionet, 2011), but he overcame this by selecting TVET College campuses which specialises in Electrical Infrastructure Construction which afforded me the opportunity to access diverse lecturers in subject knowledge and experience. Hwever, this further resulted in difficulties in the interpretation and information transcribing. In spite of these campuses being hundreds of kilometres apart, for me, accessing lecturers was a priority. Therefore, time related planning became a crucial component for this project. Semi- structured interviews were used twice for lecturers to elicit rich and in-depth responses as they reflected on their teaching practice of the ES&C NQF L2-4 curriculum. Furthermore, the semi-structured interviews helped in closing the knowledge gap created when the reflective activity tool was used, and this was also echoed by Maree (2012) and Cohen et al. (2007). Realising that participants had reached saturation point, he then arranged the focus group discussion to ensure all lecturers were collectively on the same page.

4.8.3 Focus group discussion (Round table goup discussion)

The third method to adopted for this study was the focus group discussion. Scholars have crafted many definitions of focus group, but features like organised discussion (Boddy, 2005; Kitzinger, 1994); collective activity (Powell et al., 1996); social events (Goss & Leinbach, 1996) and inter-action (Cohen. et al., 2011; Kitzinger, 1995, 1996; Merton, Fiske, & Kendall, 1990; Morgan, 1996) identify contributions and accomplishment made by these scholars in social research. However to summarise these contributions, focus groups can be defined as a "group of individuals selected and assembled by researchers to discuss and comment on, from a personal experience, the topic that is the subject of the research" (Powell et al., 1996, p. 499).

Furthermore, according to Christiansen et al. (2010), the aims of focus group discussion is to generate high quality data in the social context which help understand the specific problem from the point of view of the participants and further to this, Dilshad. and Latif (2013); Rabiee (2004); Lunt and Livingston (1996) and Gibbs (2007) posit that rich and detailed sets of data about the perceptions, thoughts, feelings and impressions of people in their own words are provided. Therefore, for this third method/tool, he used the same curricular spider-web concepts used in the reflective activity and face –to-face semi-structured interview.

The observation was that the focus groups offered the participants an opportunity for immediate feedback or clarification on one's view point, with the contributions of other group members. Furthermore, the approach also enabled the researcher to take into account not only what is said but also gestures, facial expressions and other forms of non-verbal communication (Creswell, 2012a).

While the focus group method has advantages, it also has limitations and these limitations include the fact that a few vocal participants may dominate other members in the course of group discussion and because of the nature of group conversation; some participants may conform to the responses of other participants, even though they may not agree (Cohen et al., 2000a; Creswell, 2012b; Dilshad & Latif, 2013). To circumvent this challenge, he directed participants' responses to all group members for comments.

Time allocation for our discussion was one hour. The advantage in this meeting was that participants were aware of question contents; therefore, the group discussion was meant to consolidate common understanding of the curriculum concepts as being practiced at TVET College. To ensure data was generated correctly, he recorded participants which helped me to

generate live data and be able to quote participants verbatim when transcribing and preparing the data for analysis. However, it needs to be noted that interpretative paradigm has no transformational agenda but seeks to support human knowing agenda which is to interpret and understand the phenomena (Lecturers' reflections of their teaching practice of ES&C NQF L2-4 NCV curriculum). Furthermore, it is the responsibility of individual lecturer to make interventional changes based on informed knowledge which this research is all about. Therefore, the next Table shows how data was generated.

Table 4.3: Data generation plan

Questions to answer and justification	**Objective 1**	**Objective 2**	**Objective 3**
Why data were generated?	Explore the reflections of the lectures who are teaching theory and practical in the Electrical Systems and Construction (ES&C) NQFL4 NCV programme at TVET College campuses in KZN	Understand reasons that inform the lecturers' reflections of the teaching of Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN	Explain the lessons that can be learnt from the lecturers' reflections of the teaching of the Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN
What is the research strategy?	The reflective activity, Face - to-face Semi-structured interviews and the Focused group discussion.	The reflective activity, Face - to- face Semi-structured interviews and the Focused group discussion.	The reflective activity, Face - to- face Semi-structured interviews and the Focused group discussion.
Who were the sources of data?	Seven Electrical Infrastructure Construction lecturers from two TVET College campuses teaching ES&C NQF L2-4 NCV curriculum	Seven Electrical Infrastructure Construction lecturers from two TVET College campuses teaching ES&C NQF L2-4 NCV curriculum	Seven Electrical Infrastructure Construction lecturers from two TVET College campuses teaching ES&C NQF L2-4 NCV curriculum
How often were data generated	All data generating methods were done in two phases or cycles: Firstly, lecturers were given the reflective activity which they had to complete for	All data generating methods were done in two phases or cycles: Firstly, lecturers were given the reflective activity which they had to complete for	All data generating methods were done in two phases or cycles: : Firstly, lecturers were given the reflective activity which they had to complete for

	the researcher to collect after 8 days. Secondly, one-on-one semi-structured interviews were conducted for 30 minutes per participant. And lastly a focused group discussion was also conducted for sixty minutes.	the researcher to collect after 8 days. . Secondly, one-on-one semi-structured interviews were conducted for 30 minutes per participant. And lastly a focused group discussion was also conducted for sixty minutes.	the researcher to collect after 8 days. Secondly, one-on-one semi-structured interviews were conducted for 30 minutes per participant. And lastly a focused group discussion was also conducted for sixty minutes.
Justification of this plan for data generation	The lecturers' reflective activity empowered the Electrical Infrastructure Construction (ES&C (dual-content) NQF L2-4 curriculum) lecturers to reflect on their teaching practices in the absence of the researcher allowing them the freedom to express themselves One -on-one structured interviews and the focused group discussion enhanced the researcher to get detailed and in-depth understanding of lecturers' reflection of implementing the ES&C NQF L2-4 NCV curriculum.	The lecturers' reflective activity empowered the Electrical Infrastructure Construction (ES&C (dual-content) NQF L2-4 curriculum) lecturers to reflect on their teaching practices in the absence of the researcher allowing them the freedom to express themselves One -on-one structured interviews and the focused group discussion enhanced the researcher to get detailed and in-depth understanding of lecturers' reflection of implementing the ES&C NQF L2-4 NCV curriculum.	The lecturers' reflective activity empowered the Electrical Infrastructure Construction (ES&C (dual-content) NQF L2-4 curriculum) lecturers to reflect on their teaching practices in the absence of the researcher allowing them the freedom to express themselves One -on-one structured interviews and the focused group discussion enhanced the researcher to get detailed and in-depth understanding of lecturers' reflection of implementing the ES&C NQF L2-4 NCV curriculum.

(Data generation model taken from CB Mpungose, 2016)

4.9 Data Analysis

Christiansen et al. (2010) maintains that the next destination beyond data generation, is the analysis of such data and therefore for this study, guided analysis was adopted in conjunction with the inductive and deductive reasoning approaches. Furthermore, Fei (2015); Bertram and Christiansen (2014); Biggam (2011); Cohen et al. (2007) and Ary, Jacobs, and Sorensen

(2010) concur that data analysis in qualitative research involves organising and reducing data into manageable units, evaluating it, searching for patens and in turn discovering important parts that will contribute to new knowledge. In addition, the guided analysis refers to predetermined categories of the curriculum theory namely the learning signals conceptual framework (Berkvens. et al., 2014; Khoza, 2015c; Van den Akker et al., 2009), research questions and the problem statement as reference framework. Moreover, Fei (2015, p. 567) posits that, "analysing qualitative data is an inductive process, which involves the process of transcribing recorded data into written form that is agreeable to the analysts." Other scholars who regard inductive as a qualitative component for data analysis include Backett and Davison (1995); Punch (1998); Jain and Ogden (1999);Marshall (1999); and Stolee, Zaza, Pedlar, and Myers (1999). Furthermore, Strauss and Corbin (1998), maintain that inductive analysis refers to approaches that primarily use detailed readings of raw data to derive concepts, themes, or a model through interpretations made from the raw data by an evaluator or researcher.

The raw data sourced from the participants in their responses to reflective activity; face-to-face semi-structured interview and focus group interview were cleaned and labelled, then mashed against the original source for identification purposes. However, the research tools used to generate raw data are based on curricular conceptual framework and questions to position the concepts thus providing guiding space and opportunity to analyse the data using the inductive approach. According to Thomas (2006, p. 241), "inductive coding begins with close reading of text and considerations of multiple meanings that are inherent in the text". Moreover, he posits that text segments that contains meaningful units are identified and labelled for new category created to which text segment is assigned. The above notion was also supported by Christiansen et al. (2010) when they assert that in inductive reasoning, we start with the raw data generated from participants, thereafter patterns are detected in order to draw conclusions. For this study, the data analysis was based on what the participants shared, based on questions asked to reflect on their experiences of implementing the enacted curriculum**.** Recorded data were transcribed and quoted verbatim to reflect true reflection of the participants' responses. Moreover, multi-purpose classroom photos were taken using the camera to satisfy evidence collection requirements.

Three broad tasks for qualitative data analysis activities include data reduction, data display and conclusion drawing (Christiansen et al., 2010; Miles & Huberman, 1994) hence he had to reduce all data recorded from the three research methods namely: reflective activity, face–to-

face semi-structured interviews plus the focus group discussion. To achieve this, he started by reading the transcribed data from the original sources (voice recorder) thereafter the researcher wrote all ideas as he read the data. Furthermore, he established the consistent topics which emerged from the data and therefore compiled the list of topics from different data in order to have the sets of topics and this helped me to differentiate and categorise data into the same set of topics. He then coded the topics. According to Cohen. et al. (2011), qualitative data analysis short-comings is time taken to transcribe data. Furthermore, there is a high possibility of misrepresentation of the participants by the scriber and the researcher when transcribing the data. According to Mpungose (2016), the researcher must record and transcribe data to reduce misinterpretation. Therefore, he transcribed all the recordings in my own time, rather than seeking assistance. In addition, he consulted the participants for data verification and quoted the participants verbatim. However, participants must be protected against any potential harms (none-malefince) as a result of the study being conducted. Therefore this study may not be complete if ethical issues is omitted.

4.10 Ethical issues

There seems to be a consensus amongst scholars that research ethics can be defined as a matter of principled sensitivity to the rights of others (Allmark, 2002; Babbie, 1990; Christiansen et al., 2010; Cohen et al., 2000a; Creswell, 2009; Hopf, 2004b; Murphy & Dingwall, 2001; Ponterotto & Grieger, 2008; Trimble & Fisher, 2006a). Furthermore, ethics in research are important as they may involve both humans and animals. In addition, ethical committees makes it compulsory that certain ethical principles involve the rights of participants to be protected from any harm that is likely to happen. The ethical committees mentioned are responsible for ensuring that ethical standards are adhered to. Moreover, they also examine the research design and methods prior to them being applied on participants. To be able to regulate the relationship between the researcher and the researched environment, set and agreeable ethical codes are critical to avoid harm (Nkohla, Gxasheka, Lyu, Qin, & Tyasi, 2015). Therefore, the following paragraph sses the ethical codes.

4.10.1 Informed consent (dignity and rights of the participants)

According to Allmark (2002, p. 13) "the dignity and rights are linked to consent given to the participants, to sufficient and adequate information provided as a basis for giving that consent and that the consent is given voluntarily".

Dignity and rights of the participants are linked to consent given by the participant, to sufficient and adequate information provided as a basis for giving that consent, and that the consent is given voluntarily (Allmark, 2002). For this study, the TVET College which is the area where the phenomena are explored became a priority. According to the TVET College communication protocol, the Deputy Principal (Academic Services) was a conduit through which I applied for the permission to conduct the study (see Annexure A). Once permission was granted, the Deputy Principal linked me with the College Campus Manager who is an immediate supervisor of the participants to be researched. Once the TVET College permit was issued to me, he then applied for Ethical Clearance from UKZN Human Social Sciences Research Committee, which he did after defending the research proposal (see Annexure F). Once the ethical clearance letter was issued, he then consulted the TVET College Campus Manager for a meeting with the participants in order to plan the data generation process. Once participants had agreed, he briefly explained the purpose of the study to each participant and informed them in writing and verbally of their rights to confidentiality, anonymity, and their status as voluntary participants. Furthermore, he requested participants sign a consent form, (refer to Annexure C) and provided them with a study outline as per the suggestion from Cohen. et al. (2011). The study outline included: an explanation of the procedures to be followed; description of the participants' risks; reiterated that participants would receive no financial benefit; listed advantages to the participants; made a commitment to answer any queries concerning the procedure,the establishement that there were no right or wrong answers; and an instruction that participants were free to withdraw consent and to discontinue participation at any time.

4.10.2 Avoiding harm for participants in data generation

The informed consent letter was the first precautionary measure taken to avoid potential harm to participants in terms of mental, emotional, and right to know what the study entails and the relevance to them. In Addition, the respect for their space, and the need to acknowledge the importance of negotiating and collectively sharing of space became crucial, especially as research tools demanded their live experience in practicing curriculum implementation which

implied observing them in action practising their profession. he had to negotiate and time myself to ensure that he do not intrude on their space. The next ethical code is doing justice to participants while analysing data.

Te researcher made sure that participants input was recorded. Therefore, during analysis, participants were quoted verbatim and furthermore, he cross-referenced to participants for conformity correctness. The study needed to guarantee participants confidentiality which was also a great concern. Participants wanted to remain anonymous for fear of being victimised for their input in the study. Therefore, participants were given code names and their TVET College was given a pseudo name. Participants were assured that a lockable and secured container would be used for data storage. Data would be kept for a period of five years for future references (Lüders, 2004b). The value of the data generated is dependent on the trustworthiness.

4 .11 Trustworthiness

Trustworthiness in a qualitative enquiry that represents the quality of the research findings which are able to justify and convince the readers that these "findings are worth paying attention to" (Lincoln & Guba, 1985, p. 290). Furthermore, Healy and Perry (2000) aver that the quality of a study in each paradigm should be judged by its own paradigms terms. An appropriate terminology is important in defining quality. Therefore, for the qualitative approach, (1) credibility, (2) confirmability, (3) dependability and (4) transferability are the criteria for measuring quality and trustworthiness of the research (Berg & Welander Hansson, 2000; Guba, 1981; Guba & Lincoln, 1994; Guba & Lincoln, 2004; Lincoln & Guba, 1985; Patton, 1987). Therefore, given that this study adopted the interpretative paradigm, the next paragraphs intend to present detailed discussions of the terms mentioned above.

4.11.1 Credibility

Polit and Hungler (1999);Guba and Lincoln (1994) as well as (Kerlinger, 1964), concur that the description of credibility is to ensure that findings reflect the reality and lived experiences of the participants and that true value of information is derived from the discovery of human reflections based on the phenomena being researched. In ensuring credibility of this research project, I used common triangulation methods. According to Cohen. et al. (2011), triangulation refers to the generation of data from a number of different sources and furthermore, Shenton (2004) alludes that credibility is about ensuring that the instruments used to measure results are

trustworthy and credible. Consequently, the use of three data generation methods (reflective activity, one-on-one semi-structured interview and focus group discussion) and recording of data facilitated the integrity of data generated data for this study. For the sake of trustworthiness and authenticity, he used the curricular spider-web as the conceptual framework to guide and frame all data generation processes so that all participants used the same tool of data generation. Trustwothiness terminologies cannot be complete if dependability is excluded.

4.11.2 Dependability

Scholars have different views of how dependability is defined but, according to Lincoln and Guba (1985, p. 299), dependability "seeks means for taking into account both factors of instability and factors of phenomenal or design induced changes". Similarly, on the same breath, Shenton (2004, p. 71) asserts that, "dependability is the extent to which a piece of work can obtain similar results if the work was repeated in the same context with the same methods." Therefore, to achieve dependability for this study, he provided precise evidence of the data generated by including direct quotations as shared by the participants to allow readers to assess the findings and moreover, spent time verifying items like raw data, data reduction products, and process notes.

In addition, two meeting sessions were arranged with the lecturers at their place of work to collectively explore what he observed during the reflective activity and face-to-face semi-structured interviews. Moreover, this meeting wanted to explore whether the data recorded corresponded to their input. Furthermore, the meeting intended to ensure that gaps identified during the reflective activity and semi-structured interviews were addressed during focus group discussion. The ten questions captured on the research tool included learning signals as a framework based on the curricular spider-web concepts (Berkvens. et al., 2014; Khoza, 2015c; Van den Akker et al., 2009) for the lecturers to reflect on their curriculum implementation experiences. In addition, a voice recorder was used to enable accurate transcription. I therefore ensured that transcribed data was given to participants in order to confirm the data as a true reflection of their interviews. The researcher also went back to participants to ensure that the findings of the research were verified for consistency and that the results were in line with information gathered through the multiple methods of data generation (reflective activity, one-on-one semi-structured interview and focus group discussion). he then compared generated data with each instrument to avoid being biased. Direct quotations were used to provide

evidence of data produced. Dependability was achieved by ensuring that all participants were appropriate to the purpose of the study and that results were accurately stored.

4.11.3 Transferability

Trustworthiness also includes the question of transferability, which refers to the "extent to which the findings can be transferred to other settings or groups" (Polit & Hungler, 1999, p. 717). Similarly, Cohen. et al. (2011) and Christiansen et al. (2010) concur that transferability may be described as the applicability of the research findings to another context**.** This study by design, cannot be generalised but can only be transferable to lecturers teaching an ES&C NQF L2-4 elective subject in the Electrical Infrastructure Construction NQF L2-4 curriculum at TVET College campuses with similar settings. I have ensured transferability possibilities by ensuring that the accurate findings of the study were beneficial and applicable to similar contexts which are lecturers teaching ES&C NQF L2-4 NCV curriculum settings at a TVET College campus. Thus, the findings from the lecturers' reflections from the participants can be transferred to other lecturers in other similar context. Furthermore, this study entails lecturers' reflections in the curriculum practice of the ES&C NQF L2-4 curriculum and the curriculum conceptual framework used is based on ten learning signals therefore the curriculum framework is applicable to all lecturers who are teaching similar subjects at a TVET College.The next qualitative paradigm responsible for trustworthiness of the study is confirmability.

4.11.4 Conformability

Confirmability is concerned with the affirmation whether the findings reflect the experiences and ideas of the participants, and furthermore, provides assurance that the position of a researcher has no influence to the findings (Shenton, 2004). However, Sandelowski (1986) equates conformability to neutrality as he asserts that neutrality is freedom from bias in the research procedures and results. In addition, Guba (1981), posits that neutrality refers to the degree to which the findings are solely a function of the participants and conditions of the research and not of other biases. By admission, qualitative research is subjective because the researcher is also part of the research process not separate from it (Aamodt, 1982). Therefore, to off-set this, the researcher must continuously reflect on their own characteristics and examine how they influence data generation and analysis (Krefting, 1991).

For this study, the researcher ensured my research was trustworthy by demonstrating that if it was carried out in a similar context, the research findings would highlight the reflections and ideas of the lecturers teaching ES&C NQF L2-4 NCV curriculum. As a result, all participants received the same set of questions through different data generation methods. Data generation was conducted in such a way that the findings presented the true reflections of the participants. Moreover, a voice recorder was used to record all sessions. Finally, the findings were confirmed by participants as true reflections of their responses. As the qualitative researcher, he acknowledged bias and possible circumstances that might have affected the data in any way and have ensured that he did not use my power as a researcher to influence the findings. Research quality and trustworthiness cannot be completed without including rigor.

4.11.5 Rigour

Rigour is defined as the quality of being thorough and careful (Oxford University Dictionary (2016) while Creswell (2012a) regards rigour as a research that applies the appropriate research tools to meet the stated objectives of the investigated phenomena. Guba and Lincoln (1994) suggest that rigour can be attained through careful audit trails of evidence, participants validation when coding or categorising results, and the triangulation process. In this regard, all chapters written were rigorously checked by the supervisor and noted errors were corrected and re-submitted before the researcher could proceed to the next section. he regard this activity as a management quality audit.

As a researcher intending to explore the lecturers' reflection on the teaching of ES&C NQF L2-4 at TVET College campus, he embraced and implemented advice from McMillan and Schumacher (2010), and Guba and Lincoln (1994) in order to enhance quality and acceptability of the research findings by the readers. Furthermore, he was mindful of interpersonal emotions as I interacted with the participants and furthermore, he truthfully captured the data generated, and cross-referenced it to the participants for them to check if the data analysis reflected their views after lecturers reflected on the teaching of ES&C NQF L2-4 at TVET College campus. A lot was done to ensure quality and that an acceptable product is achieved in this study, yet he still had my shares of limitations and potential challenges.

4.12 Limitations and challenges

Research projects will always be faced with their own limitations and challenges regardless of the research methodology and approach adopted (Bertram & Christiansen, 2014; Marshall &

Rossman, 2006). For this study, limitations and challenges were based on the following categories: Systemic challenges; Logistical challenges and Process challenges.

4.12.1 Systemic challenges

At the time of the field work visit, the TVET College had gone through campus programmes restructuring resulting in reduced numbers of ES&C NQF level classes and thus resulting in lectures toggling between L2-4 of the same subject. This had an impact from the numbers point of view which in turn affected the sample number targeted (Lecturers teaching ES&C NQF L2-4). This then led to the change of plans to involve other Electrical Infrastructure Construction (EIC) core subject lecturers. These IEC core subjects involves Electronic Control and Digital Electronics; Electrical Principles Practice; Electrical Workshop Practice and Electrical Workmanship. The reason for using the EIC lecturers is that the EIC subjects are core subjects within IEC and lecturers are exposed to the same NCV programme conditions which is teaching the OBE NCV curriculum and this was done to increase the sample. Campus A provided one ES&C NQF L4 lecturer and campus B provided two lecturers. Therefore, for this study, ES&C NQF L2-4 participants were sourced from two campuses in order to increase the ES&C sample (see Table 4.1).

4.12.2 Logistical challenges

The tight academic teaching programme schedule, with little spare time between sessions resulted to time constraints. The researcher then increased the TVET College campus visits to improve time spent with participants.

4.12.3 Process challenges

This challenge is related to the research approach adopted for the study. The interpretative paradigm by being qualitative, is a low-scale sample and furthermore, subjective, personal and contextual, and therefore, its findings cannot be generalised but can be transferred to participants and other lecturers exposed to similar settings within the TVET College campuses. Moreover, lectures became so passionate with the project such that they willingly produced relevant and valuable information beyond the scope of questions framework thus resulting to too much data. Additionally, he struggled to control the flow of such quality information.

4.13 Chapter Conclusion statement

This chapter deliberated on the research design and methodology which covered the research paradigm, and seeks to support human knowing for interventional change needs. Moreover, the chapter presented the research style, sampling, data generation methods, data analysis, ethical issues, trustworthiness, and research limitations. Furthermore, the methods mentioned, clearly indicate how the study intends to achieve the research aims which are to explore the lecturers' reflections of the teaching of the ES&C NQF L2-4 NCV curriculum. In addition to that, the methods highlighted how the research questions were to be answered. Moving forward, the next chapter reveals the research findings and discussions based on the data analysis.

CHAPTER 5

Research Findings And Discussions

5.1 Introduction

Chapter Four presented the research methodology and strategy of this study and furthermore, highlighted that a case study framed in an interpretative paradigm is used for this research. This chapter therefore reveals the outcomes of the data generated using three methods namely the reflective activity exercise; face-to-face semi-structured interviews and lastly the group discussions. For this study, seven participants (see Table 4.1) were studied to generate the data. Their code names are: P1; P2; P3; P4; P5; P6 and P7. In addition to the above, research questions which the data needs to respond are presented below.

5.2 Research objectives and questions:

In addition to what is covered in 5.1, Chapter Two covered ten curricula spider-web concepts or ten learning signals used as a framework for the study. Therefore, in line with the ten curricula spider- web concepts/learning signals, this chapter seeks to achieve the following objectives:

- Explore the reflections of the lectures who are teaching theory and practical in the Electrical Systems and Construction (ES&C) NQFL4 NCV programme at TVET College campuses in KZN

- Understand reasons that inform the lecturers' reflections of the teaching of Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN

- Explain the lessons that can be learnt from the lecturers' reflections of the teaching of the Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN

The above objectives will be achieved through addressing the following research questions:

- What are the lectures' reflections of the teaching of ES&C NQF4 NCV curriculum at TVET College campuses?

- What informs lecturers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses? (Why these reflections?)
- What lessons can be learned from the teachers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses?

In Addition to the study objectives and questions, the main purpose of the study is to explore the lecturers' reflections of the teaching of ES&C NQF L4 NCV curriculum at TVET College campuses.

5.3 Findings and discussions

Scholars Cohen. et al. (2011) contend that a project specific plan of analysis to guide the data analysis in order to achieve the study objectives must be developed. Therefore, Table 5.1 shows how findings are presented by following the curricular spider-web concepts/learning signals themes (Khoza, 2015c; Van den Akker et al., 2009) to guide the analysis. The findings are followed by discussions based on related literature. Reflections are separated by levels namely technical, practical and critical levels of reflections. The reflection levels are linked to categories.

Table 5.1 Themes, questions, level of reflections and categories

Themes	**Questions**	**Reflection levels**	**Level categories**
Rationale	Why are you teaching (Rationale/visions) ES&C NQF L4 NCV curriculum? **Respond on:** • Personal reasons • Professional reasons • Societal reasons	Technical level Practical level Critical level	Professional rationale Societal rationale Personal rationale (pedagogical)
Accessibility	How do students access the learning of ES&C NQF L4 NCV curriculum? **Respond on**: • Physically; • Financially • Culturally.	*Technical* l level Practical level Critical level	Physical access Financial access Cultural access
Goals	Towards which goals are you teaching ES&C NQF L4 curriculum? **Respond on:** • Aims,	*Technical* level Practical level Critical level	Objectives Outcomes Aims

	• Objectives, • Outcomes		
Content	What content are you teaching in ES&C NQF L4 curriculum? What is the practical training guide content of your training of ES&C NQF L4 NCV curriculum? **Respond on:** • Topics • Practical modules/Projects • Practical guide content • Subject knowledge	*Technical* level Practical level Critical level	Topics l(literature) Practical and on-site training Subject knowledge
Teacher role	How do you perceive your role as an ES&C NQF L4 lecturer? **Respond on**: • Teacher-centred (instructor) • Learner-centred(facilitator) • Content-centred approach(assessor)	*Technical* level Practical level Critical level	Teacher-centred (instructor/lecturer) Learner-centred (Facilitator) Content-centred (Researcher/assessor)
Teaching activities	Which activities are you using to teach and train ES&C NQF L4 curriculum? **Respond on:** • Informal assessment task • Formal assessment task • Formal learning activities • Practical module training • Supporting tasks	*Technical* level Practical level Critical level	Informal assessment task Formal assessment task + Practical module training Supporting tasks
Learning Resources	What resources are you using to teach ES&C NQF L4 curriculum? How do learning facilities cope with learner: trainer: facilities ratios and what impact it has on product quality? **Respond on:** • Hard-ware • Soft-ware • Ideological-ware	*Technical* level Practical level Critical level	Hard-ware Soft-ware Ideological-ware
Learning Location & Time	Where and when are you teaching ES&C NQF L4 and what is your training workshop accreditation status? **Time** Hours and Days	*Technical* l level Practical level Critical level	Classroom (Teaching hrs) Workshop (Years) Computer laboratories (Days)

Assessment and Quality Assurance	How are you assessing learners in ES&C NQF L4 NCV curriculum and who quality assures theory and practical? How do you manage portability and credibility of skills acquired by learners?	*Technical* level ⟷ Practical level ⟷ Critical level ⟷	Assessment of learning Assessment as learning Assessment for learning

Taken from the curricular learning signals (spider-web)(van Den Akker 2009 and Khoza 2015c

5.3.1 Why are you teaching ES&C NQF L2-4 NCV curriculum at TVET College?

Rationale: Theme 1

Phase One: Reflective activity

Rationale, as a theme seeks to establish what motivates lecturers' teaching of ES&C NQF L2-4 (elective) and other Electrical Infrastructure Construction (EIC) core subjects. Lecturers reflected at critical level (personal rationale), practical level for (societal rationale) and technical level (professional rationale). Interestingly, none of the lecturers reflected on all three propositions during Phase One. Nevertheless, this is how they reflected during Phase One.

P4 remarked, **"***To prepare learners for the job market, develop and encourage entrepreneurship and reduce crime by making people employable*." Furthermore, P6 commented as follows, *"I am technically qualified and passionate to impart content knowledge and understanding of the South African grid network to my NCV students in order to make them relevant to the electricity distribution utility stakeholders for employment opportunities***.**" The South African grid is a power utility network connectivity system found between power generators, transmission and distribution networks. However, P1 said," *Teaching career provides me with job security compared to private sector industries."* Participants P3 and P7 also regarded students' preparation for employment as a priority to curb un-employment and poverty. None of the participants embraced all three propositions. The majority regarded students' preparation for workplace and employment as a priority and this helped me to identify conceptual understanding gaps. I then shifted to face-to-face semi-structured interviews which offered me an opportunity to probe and give clarity on reflection levels and associated categories. Furthermore, I gave the participants literature on reflection levels as part of preparations for the group discussions (preparation for Phase Two) resulting to P5 remarking," *I wish we could have more time to spend in order to improve our understanding of the*

curriculum concepts for us to be effective in the teaching of students". The following paragraphs presents lecturers' reflections after being aware about the significance and meaning of the three reflection propositions and categories.

Phase Two (Discussions and findings)

P3 remarked, *"I am here to develop students to earn and sustain themselves in a decent and acceptable way contrary to sustain one's life by stealing."* And P5 remarked, *"For me to achieve the above, I have a trade-test certificate (Electrical) and now studying Bachelor of Education degree (BEd) at UKZN to further my professional development. The pedagogical knowledge gained through these studies has broaden my understanding of educational concepts*. Moreover, **"***I am the technical education agent to bring change in our society for technical education adaptation to support social reconstruction*".

Furthermore, P4 added the following perspective, *"My teaching reason is to earn living and bring bread on the table for my family, and moreover**,** I am versatile teaching theory and practical and now fully established which gives me satisfaction. Furthermore, I was a student at this college in 1991 then became an Apprentice, Artisan and in addition to that I have N-Diploma (Electrical HC). Further to this, I am a moderator through ETDP SETA and now professionally qualified with NPDE from* UKZN. *Moreover, I have recently received two awards, one for producing high pass rate marks for Report 191 Trade Theory as well as high pass rate in Electrical Workmanship (EW) NCV programme* (personal achievement). *Beside me in person, the college is planted to assist the community and we are agents positioned to do that and this can be achieved through us lecturers".*

In same line of thinking, P6 added, "*I have acquired trade knowledge in a difficult manner and chose to come and share my experience with students having technical qualifications only. These qualifications are National Diploma Electrical Engineering (HC) and trade-test electrician. In my view, it is a must for any trade related subject to be taught by a technical qualified person and these are more important than educational qualifications. Furthermore, I got the NPDE from UKZN and the assessor certificate from the ETDP-SETA which made me a professional after being already employed as a lecturer. The professional qualification improved my pedagogic knowledge and students' management, communication and planning*. P1 interjected, *"I have more than 18 years of both trade and teaching experience and I am here to transform students to better human beings capable to be better citizens. Furthermore**,***

I am a section 28 trade- tested electrician and currently doing BEd degree which has sharpened my teaching strategies." He further said, "*We are doing the teaching qualification because our technical and Industrial experience is not recognised, therefore the academic qualification is done to meet the department and professional registration requirements"*. However, participants argued that specialised subject knowledge should be privileged than general academic pedagogical knowledge.

However, P5 argued as follow, "*Lecturers come to TVET College because of employment opportunities but for me it is different. I came from Industry which had more benefits but chose to come to TVET College to develop our community"*. P5 continued, **"***However, my desire to see students succeed in their personal development endeavours motivates me to contribute wholeheartedly at making them pass their practical and theoretical summative assessment in order for students to position themselves favourable for further development and employment opportunities. Moreover, I am a qualified lift technician with an abundance of industrial experience holding a BE degree professional qualifications which has assisted me to improve my pedagogical knowledge organisation resulting on my professional proficiency improvement and furthermore registered lecturer with SACE"*. Further to this, P2 commented. *"The frequent students' protests on NSFAS is a great concern as it affects my Integrated Summative Assessment Tasks (ISAT) planning especially as students' numbers are bigger than facilities and equipment. Furthermore, the late arrival of resources complicates the entire ISAT content and these challenges impact on turnaround time to mark, record, give feedback and capture the records in the POA and POE files for moderation*". All participants concurred with P2. However, they stressed that, in spite of these challenges, they were committed to do their best to ensure all students do ISAT.

Participants were able to engage in all propositions, the personal reason, societal reason and professional/technical reason. What was observable is the dominance of societal rationale followed by personal rationale and lastly the technical rationale. All participants concur that they obtained teaching employment to assist students to be developed in order to enhance their employment opportunities.

Furthermore, interpretative/practical reflection is concerned with the lecturers' application of principles that guide their teaching practices and this involves lecturers being concerned with the aims and objectives to be achieved (van Manen, 1977a; Zeichner & Liston, 1987) . Therefore, the broader government goals (outcomes) motivated lecturers to select the societal reasons over the other two propositions. However, personal rationale is critical for personal identity and interests.

The commitment to social transformation via technical education appeared to be shared by the majority of the participants, P6, P5. However, P3 remarks, "*I am here to develop students to earn and sustain themselves in a decent and acceptable way contrary to sustain one's life by stealing*", is more relevant and a major societal concern. In the South African context, crime has joined poverty, un-employment, in-equality as the key areas the TVET Colleges are positioned to address. Refer to the next paragraph for references on the mandate of TVET Colleges. Furthermore, the next sentence presents the position of the United Nations (UNESCO) and the International Labour Organisation (ILO) on the mandate of TVET Colleges in addressing the global societal challenges. Thus,UNESCO and ILO (2002) aver that education and skills formulation lead to less un-employment and more equity in employment. By virtue of TVET College being competence-based driven (CBET approach). CBET offers programmes which are relevant to the employers. Furthermore, competence-based programmes are in line with horizontal curriculum which is dominated by every day knowledge/societal opinions (Bernstein, 1999; Bertram, 2012). This knowledge makes it easy to adapt to the changing technology thus be relevant to industry and commerce.

Furthermore, P3 alluded, ***"****I am the technical education agent to bring change in our society for technical education adaptation to support social reconstruction"*. This was supported by P4 and P1. However , this remark is in line with the vision of scholars that TVET Colleges are a key component mandated to provide important support system required by any nation to support the economic growth strategy through providing human resources with relevant knowledge, skills, values/attitudes and competences (Adam et al., 2015; Akoojee., 2016; Ayonmike et al., 2015 ; Ezeani & Urama, 2014 ; Majumdar, 2013; Rasool. & Mahembe, 2014). Therefore, for South Africa, TVET Colleges are mandated to "produce skilled and capable workforce to support an inclusive growth path**"** (DHET-Senior-Management., 2016, p. 28). It is through the alignment of the intended (policy and documented), the enact (lecturers as implementers) and the attained curriculum that broader goals will be achieved.

Personal rationale (critical reflections) –The why?

The why question addresses individual needs and identity. Therefore, key attributes which may assist in the realisation of the most challenging missions includes passion, determination, drive, commitment, reflect for action, knowing own limitations and strength (introspection) among others.

During Phase One session, only two candidates expressed their personal reasons for teaching ES&C NCV curriculum and their views were as follow: P6 comments, *"I am technically qualified and passionate to impart content knowledge and understanding of the South African grid network to my NCV students in order to make them relevant to the electricity distribution utility stakeholders for employment opportunities"* and on the other hand P1 remarked, "*Teaching career provides me with job security compared to private sector industries".*

The first view reflected a person whose interest is centred on student development to provide guidance and create potential employment opportunities, while the second opinion is job security which is very critical for a breadwinner. However, during Phase Two, most participants had a better understanding of the concepts therefore were able to reflect. P6 remarked, "*The professional qualification improved my pedagogic knowledge, students' management, communication and planning"* The same sentiments were echoed by P1. Both participants obtained their teaching qualification after being permanently employed as lecturers. They started as technicians and ended as professionals and realised the power and the benefits of scientific content. P4 cited bringing bread on the table for his family as the main reason for taking employment and this is in line with P1's declaration. P5 commented," *My desire to see students succeed in their personal development endeavours motivates me to contribute wholeheartedly at making them pass their practical and theoretical summative assessment in order for students to position themselves favourable for further development and employment opportunities"* At Macro-level this remark is in line with the NCV Policy 2006 which asserts that "The National Certificate (Vocational) 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 entrance into Higher Education" (DoE Minister Pandor, 2006, p. 83). At Supra-level, this is in line with Tikley (2013) opinion that the TVET College system is responsible for human capabilities approach which is viewed as the means for developing a range of skills, aptitudes and competences and furthermore "can contribute to economic, social, political, environmental and cultural development" (Tikley, 2013, p. 4). P5 holds a BEd degree with more than ten years' industrial experience.

Additionally, P2 raised concerns about campus stability for conducive teaching and learning and remarked, *"The frequent students' protests on NSFAS is a great concern as it affects my ISAT planning especially as students' numbers are bigger than facilities and equipment. Furthermore, the late arrival of resources complicates the entire ISAT content process and*

these challenges impact on turnaround time to mark, record, give feedback and capture the records in the POA and POE files for moderation". The first concern is centred on students' politics, which is a domain for critical reflection especially if it has an impact on teaching and learning. Scholars are agreable that critical reflection is a desirable reflection level for lecturers and further concur that this reflection involves thinking about social, moral and political dimensions of schooling (Maxwell, 2013; Smyth. et al., 1999; Taylor, 2004; Valli, 1997b; van Manen, 1977a).This implies that lecturers' reflection development growth level enables the lecturers to apply holistic approach when dealing with teaching and learning dynamics challenges and the political dimension was further supported by Çimer. et al. (2013); Kehdinga (2014) and Apple (2003). During group discussions participants were of the view that the lack of anticipation and prompt responses from management is a contributing factor but maintained that DHET was not innocent as student strikes are recurring annually.

Furthermore, participants concurred that resources are a huge obstacle at achieving the intended, implemented and attained outcomes. However, the poor vertical collegial relationship and lack of shared vision was seen as an area deserving urgent attention especially the supply chain and curriculum manager for prompt intervention. The lecturer's personal identity is very important for any facilitator teaching ES&C NQF L4 NCV curriculum which combines theory and practical (Dual-content) as it may inculcate positive values and experiences to students for their own development.

. The commitment, passion, pedagogical content command and technical capability are among key attributes defining the character and identity of such lecturers.

Professional rationale (Technical reflections)- The what?

None of the participants remarked about their professional qualification during the reflective activity, the Phase One. However, this is how they reflected during Phase Two group discussion.

P6 argued the importance of technical qualification as a priority for a TVET College lecturer and remarked," The *qualifications I had when I joined the college are National Diploma Electrical Engineering (HC) and trade-test electrician. In my view, it is a must for any trade related subject to be taught by a technical qualified person and these are more important than educational qualifications. Furthermore, I got the NPDE from UKZN and the assessor certificate from the ETDP-SETA which made me a professional after being already employed*

*as a lecturer**.** The professional qualification improved my pedagogic knowledge and students' management, communication and planning".*

In the same line of thinking, P1 remarked, *"I am a section 28 trade tested electrician, N-Diploma (Electrical) and currently doing BEd degree which has sharpened my teaching strategies. Moreover**,** we are doing the teaching qualification because our technical and Industrial experience is not recognised, therefore the academic qualification is done to meet the department and professional registration requirements".*

P5 obtained his BEd degree in 2004 before being employed at the college and this were his remarks,

"I am a qualified lift technician with an abundance of industrial experience, N-Diploma (Electrical), assessor and moderator and holding a BEd degree professional qualifications which has assisted me to improve my pedagogical knowledge organisation resulting on my professional proficiency improvement and furthermore registered lecturer with SACE. However, the academic qualification design does not address content knowledge mastery and advanced practical challenges like renewable energy technologies which is problematic".

During the group discussion session, P3 remarked as follow, *"Instructing a dual-content theory (facts) and practical (doing/how) subject like EPP NQF L4 made me realise the importance of having a balance between technical qualification, practical experience and the pedagogical knowledge. Therefore, to meet the above, I am a qualified electrician with N- Diploma (Electrical) and currently doing BEd degree*".

The participants' reflections present diverse views. Firstly, participants agree that professional qualification add value to their professional practice and this is confirmed by P1, P6 and P5. Moreover, the TVET College recruitment system, seems prioritise technical qualifications over the academic. Common technical qualifications include Engineering Technicians Diploma, N-Diploma and Trade-Test Certificate while the Academic qualification includes University degree or Diploma. It needs to mentioned that there is no TVET specific academic qualification offerd at our local universities, all is still in the pipe line. However, this trend may promote semi-professionals (technicians) in the TVET College sector. Furthermore, the value of professional qualification knowledge is bigger than having a qualification to meet the DHET or SACE requirements as suggested by P1. Moreover, reflections of P4 indicate that

commitment and dedication can yield positive results in the delivering of intended, implemented and the attained curriculum. This is in line with van Manen (1977a) and Zeichner. and Liston (1987) who posit that technical reflection level promotes professional knowledge. However, P5 indicate the importance of the professional qualification design to be sensitive to TVET College needs in order to address content knowledge and innovation technologies.

In addition, professional knowledge empowers lecturers with knowledge to understand underpinning principles relevant to the NCV curriculum. Moreover, the ES&C NQF L4 NCV is competence/student-centred, horizontal curriculum dominated by everyday knowledge where school knowledge and international standards are not being prioritised (Bernstein, 1999; Bertram, 2012). Regardless of the latter statement, ES&C NQF L4 final assessment is bench-marked against national standards set by DHET and Umalusi Quality Assurance. The theory (knowledge/facts) is a vertical curriculum guided by school knowledge and national standards while the practical (ISAT) is set by DHET appointed examiners and standards are not a priority from both DHET and TVET College. Despite the participants' reflections being dominated by societal reasons followed by personal reasons, the professional/ performance reflection is equally important especially as teaching and learning is dependent on ideological-ware that is the technology of education (Amory, 2010; Khoza., 2013a). In addition to the above, curriculum vision and implementation cannot be achieved in the absence of lecturers and students accessing learning and teaching space.

5.3.2 How do students and lecturers access the learning and teaching of ES&C NQF L4 NCV curriculum?

Accessibility: Theme 2

Only two participants reflected on the Phase One reflective activity, and none responded accurately on all three propositions. P6 remarked, *"I access teaching the ES&C NQF L4 through the prescribed textbooks, peers, practical sessions and internet"* This was also supported by P4 who added," *I access teaching ES&C NQF L4 through assessment and subject guidelines, equipped classroom and workshop"*. P6 added, "*When it comes to financial access, I use my own finance to purchase data and use personal laptop to access internet for further information to empower my students"*. P4 interjected, *"Students are entitled to apply for the NSFAS bursary when they arrive at the college and the successful students receive payment in*

September". On cultural access P6 remarked, "*I do code switching from English language of learning and teaching – LOLT to Nguni for clarity and emphases".*

During Phase One, both participants misinterpreted physical access to the resources used to teach the content as opposed to accommodation and transport. Furthermore, they were not able to respond to the cultural access (critical reflection) proposition. In view of the challenge, I arranged the Phase Two group discussions. Two venues were identified, for P5 and P6, we had a meeting at their Electrical Infrastructure and Construction (EIC) NQF L4 learning site. However, a different meeting date was chosen for P1, P2, P3, P4 and P7 at their EIC NQF L4 learning site.

Phase Two: Discussions and findings

Physical access (Professional reflection)

This is how participants reflected during Phase Two group discussions, responding to physical access**.** According to P5, *"Students come as far as Umtata, Durban, Kokstad, Ezingolweni and Port Shepstone surroundings. As for accommodation allocation on arrival, no provision is made by the TVET College but students use the friends net-work to find sleeping place. Furthermore, a college security guard provides accommodation contacts for those in need which is based on first come first served. The accommodation places are at close proximity to the College thus enabling students to walk to the college for registration. Some local students stay far from the college thus travelling by taxi combis to the college. And these students require transport allowance on daily basis between the college and home twice".* P5 further articulated that, *"Students from far places pay rent to home-owners on monthly basis and the money is obtained from their parents hoping to recover the payments once their NSFAS applications are approved and paid". As* for lecturers, P5 articulate, "*We stay far from the college and use our own cars. I come from Umtwalume and pay R3000 per month.* P6 remarked*. " I stay at Margate paying R 2500 per month".* However, P1 added, *"Our campus is located in an urban area and my place of stay is approximately sixty kilometre away from the campus and my petrol expenses is R2000 per month"*. P2 and P4 agreed with P1. *"Moreover, rental is expensive for students in this suburb and poor rental habits results into student being expelled which results to poor student retention and drop out"* reflected P4.

The participants reflections indicates that students drop out is caused by students failing to honour rental commitments. However, reflections are quiet on contractual arrangements between the

tenant (students) and the landlord. Furthermore, no mention of the guarantor responsible for representing the student. The researcher is is of the view that, the TVET College should take the role of being a guarantor as is has access and handles the NSFAS. The College will be in better position to negotiate on behalf of students to solve the rental issues thus prevent students from being expelled by the landlords. Moreover, this may also prevent drop out rates.

Financial access (Practical reflections)

According to P5, "*Deserving students based on NSFAS criteria apply for bursary on their arrival at the TVET college. The bursary allocation consists of tuition fee, transport and accommodation".* P6 interjected, "*The allocation may not be 100% across all levels but NQF L2 is entitled for 100% while L3-4 will be allocated according to subjects passed at the previous levels".*

Furthermore, during group discussions, the researcher asked whether there was any financial plan (budget) aimed to accommodate staff development, inter-college, cluster meetings and student industrial excursion plan. In addition, he asked the participants if the Human Resource Development (HRD) unit was fully functional for the coordination of staff personal development plan involving departmental initiatives and other external training service providers. P2 said, "*There is no HRD unit at our college except Human Resource (HR) which is responsible for staff employment and pay roll activities.*" Furthermore, P4 added, *"No annual plan provisioning for students' industrial excursion which I think should be a responsibility of the curriculum manager and head of departments."* These comments were also echoed by P1 and P3. Findings through lecturers' reflections reveal that there are barriers to students' access and exposure to industrial culture and new technology caused by the lack of coordinated planning and this has adverse outcomes to student development and the attained curriculum. Furthermore, the none existence of the HRD unit may deprive lecturers to access current technical knowledge which may also affect the technical proficiency of lecturers thus impact negatively on the delivery of intended and implemented curriculum.

Cultural access (Critical reflections)

According to P5, "*Cultural access to us is defined by ethnic diversity and integration, local cultural activities and college organised sports activities total impact. Furthermore, our campus is situated in a semi-rural area and student community is mainly Africans and therefore cultural diversity has no impact in learning and teaching"*. P6 interjected, "*For our TVET College, both lecturers and students participate in a sports extravaganza within the college calendar across all*

campuses and athletes participate in different sport codes commonly done in September". P6 remarked, *"These sports activities commence at inter- campus to inter-college, provincial and National levels. Furthermore, notification is issued to us [lecturers] through student's affairs about dates so that we plan key learning areas being aware of potential threats to time schedule. However, learning and training proceeds as normal but excludes those students participating in sports activities*". In addition, P5 remarked, *"Local cultural activities are not an issue to us because most students are foreign to local developments however absenteeism of students as they collect grants payment from South African Social Security Agency (SASSA) on monthly basis is a big threat to effective learning"*. These sentiments were echoed by all participants.

In the same line of thinking similar to P5, P1 remarked, *"I teach in a multi-racial campus dominated by Indian and African students' cultural activities are not an issue, and sports across campuses is not done. Students focus on their studies as per the curriculum plan and annual time-table"*. These remarks were supported by P2, P3 and P4. Moreover, P3 added, "*Students diversity and curriculum accessibility in terms of their qualifications is not much of a problem to the lecturers but those students who come from disadvantaged backgrounds especially with Grade 9 and 10 fall –out because of the curriculum content complexity and only grade 11 and 12 succeeds. Students choose the elite programmes like Electrical Infrastructure Construction due to lack of vocational guidance without considering the knowledge assumed to be in place".* P3 remarks were backed by all other participants but P2 added, *"There seems to be no better selection criteria because we are guided by Grade 9, -12 entry requirement instructions and numbers are more important for the college".* Furthermore, P5 made the following comments, "*We force students to pass and do not spoon feed them until they pass regardless of their levels and our campus became the higher achiever provincial in the vocational subject"*

The research findings reveal that students and lecturers are affected by physical, financial and cultural access issues. House owners (Landlords) low tolerance to students' late rental payment results to them being evicted and disrupted from proceeding with studies. This tendency increases students drop out rate and poor retentions.

In line with the above, transport allowance which is part of NSFAS package is paid as a once off trench in September, making it difficult for students to cope financially thus resulting into student protests and strikes. The students' village, which is part of 2030 NDP vision, is not yet delivered to TVET College student and the assumption is that it will solve some of the problems.

Lack of financial injection to source sufficient and relevant training equipment and consumables is a major challenge facing the TVET College. This results in failure to deliver the intended and practiced curricula at Micro-level, resulting in failure to achieve the attained outcomes (skills, knowledge, values and technical competences). Furthermore, the findings reveal that TVET College do not have the HRD unit responsible to plan the lecturers' personal development, (refer to remarks from P2 page 116). Moreover, lecturers alluded that budgetary constraints have adverse impact on the Work Integrated Learning (WIL) programme. Participants reflections revealed that there is no plan for students' industrial excursions desirable for exposure to new technologies and access to workplace culture. Furthermore, students' absenteeism and lack of discipline are a major challenge to lecturers. Moreover, findings also revealed that student recruitment is biased to quantity over quality. The study revealed that the majority of students rerecruited by TVET College are Grade 9 and 10 resulting in later drop outs caused by the complexity of programme content in the ES&C NQF L4 curriculum. The drop outs results in a waste of resourses and opportunities that would have been taken by the correct recruitment. However,the right of access to quality education regardless of socio-economic status is a fundamental right to all South Africans (Altbach et al., 2009; Berkvens. et al., 2014; Bernstein, 1987; Government of South Africa, 2017; Malle et al., 2015). The proposed solution to favour quality intake is the equitable distribution between Grade 9-10 and Grade 11-12 as opposed to the first come, first served, principle to fill up spaces. However, the success of the implemented curriculum plan will be fundamentally influenced by the set goals which may be long-term, medium-term and short-term.

5.3.3 Towards which goals are you teaching Electrical Systems & Construction NCV curriculum?

Theme 3: Goals

Reflections on goals intend to establish if lecturers are aware of aim, objectives and outcomes in their application of curriculum. Furthermore, the reflections should establish the understanding of the implications of broader goals driving the Government vision of the TVET College role in skills development revolution. Therefore, lecturers are expected to reflect on aims (personal/critical reflection), objectives (professional reflection) and outcomes (practical reflection).

Phase One (Reflective activity)

Being guided by the curricula spider concepts and questions, P6 remarked**,** *"The aim is towards shaping well versed, respected and skilled artisans for the future"*. Further to this, on objectives he remarked*, "Towards imparting knowledge content and skills to the best of my ability".* On the outcomes his remarks were, "*To ensure that students are able to tell the outcomes and able to utilise them when necessary".* Other participants found it difficult to explain the curriculum goals during Phase One. Therefore, I supplied the participants with documents from (Khoza., 2013b), Kennedy. et al. (2006) and reflection material from van Manen (1977a) to prepare them for the group discussion. This gave way for Phase Two.

Phase Two: Group discussions and findings

Objectives (Technical reflection)

P2 remarked *"Electricity demands high safety alertness from students because it can kill. Therefore, conducting risks assessment is crucial before we start the practical activities and this is a common safety procedure practice guided by Health and Safety Act. However, for this exercise, you are all expected to identify two risks associated with PPE, power tools and hand tools for our group discussions.*"

In the same line of thinking as P2, P4 interjected**,** *"Our campus is a multi-racial thus also multi-cultural and therefore as lecturers we are expected to support students to acclimatise to social and cultural challenges they face at college daily life which may extend to the world of work life"*.

However, during same group discussions, P5 raised concerns on technical skills proficiency and remarked, *"Fault finding is a critical skill required from any electrical trade personal. Furthermore, the understanding of circuit diagrams, testing and speed is crucial and therefore my intention for the ES&C class is to ensure that 50% of my students are able to fault find problems on a three-phase motor and control circuit in less than twenty minutes. This will be achieved through group activities and drill work".*

The reflections from P2 and P5 indicate more subject-specific outcomes. However, P6 remarked,*"Objectives are measurable, achievable target oriented and time bound."* Furthermore, P3 commented, *"Objectives are short-te m in nature and driven by the lecturers' intentions."* Participants proceeded to the outcomes (goals) which privilages student-centred approach and a key component for the development of competences. This domain, is dominated

by every day and societal opinionated knowledge. Therefore the next paragraph presents participants reflections on outcomes.

Outcomes (Practical reflection)

During group discussions, P5 remarked as follow, "*The subject guidelines, assessment guidelines and the textbook do not cover the programme aims and objectives but focuses on subject outcomes and learning outcomes. Furthermore, the learning approach for this programme encourages students to be participative in their learning rather than being spoon fed. As a lecturer, our job is to empower the students with subject knowledge, values and skills so that they can be employable and be able to put food on the table for their families."*

In same line of thinking, P3 said, *"For the student-centred approach, talk time is fifteen minutes, thirty-five minutes is for students group discussions while I observe and facilitate. The last ten minutes is for students to submit theory activities report of learning outcomes achieved in the subject.*"

In addition, P4 said, "*We do not only focus on subject and learning outcomes as we teach students but also assign them tasks that encourages problem solving abilities. Furthermore, encourage them to work effectively in groups or team which is crucial for the future. Moreover, we encourage students to know technical names of equipment, tools and machinery parts*".

Moreover, P6 made the following remarks on outcomes approach, *"The subject guidelines provide the main topic, subject outcome followed by the range choice and the learning outcomes to be achieved by individual students, which ultimately may generate the evidence of what they are able to do at the end of learning. As a lecturer, I only facilitate and monitor learning proceedings and give guidance where necessary. ES&C being a dual-content, the shortage of resources for the practical component hinders the learning plan and therefore at times I am forced to lead the teaching as an instructor".* In concluding the group discussions, P1 said, "*To facilitate in a student-centred environment, I use a multi-purpose classroom equipped with different models and desks are paired to match students with different capabilities and furthermore, this encourages students to discuss and conduct peer assessment. At the end of each lesson, students are expected to recall, explain, apply and design electrical circuits to show what they know and able to do".*

Comments from the participants reflect that aims and objectives (which belong to the lecturer) are not a priority but outcomes are what they focus on. When participants were asked if they ever refer to the NCV Policy 2006 and SAQA ID 50441 documents for aims and objectives, they reflected, *"Those documents are kept by the curriculum manager at Central Admin*

Office" remarked P5. Participants P4, and P2 agreed with P5. However, this implied the need for these documentations to be cascaded down to lecturers for content discussions with the relevant manager. Moreover, P4 remarks highlights the importance of critical outcomes in the teaching of ES&C NQF L4 subject as they develop students for the future. Furthermore, P6 raised the resources as being a huge challenge which impacts negatively on the curriculum delivery plan, and this results in the lecturer's role changing from student-centred to teacher-centred approach to improvise for time wastage. However, P1, P6 and P3 share a common view that student-centred approach encourages students to be accountable for their learning through providing evidence of what they know and can do.

Aims (Critical reflections)

"*DHET employed us (lectures) to accomplish the constitutional mandate of equipping students adequately with relevant skills, knowledge and values for social efficiency to afford smooth transition between the TVET College and the world of work"* remarked P5 during discussions. Furthermore, P1 said**,** *"I have acquired knowledge and experience as an artisan to equip my students with both theory and practical for them not only for employment but for them to be able to start their companies and be able to create jobs to sustain themselves and their communities*". In line with the above P2 said, *"The fight against poverty, unemployment, inequality and crime can only be achieved through ensuring that our students are effectively capacitated technically to participate efficiently in the world of work and I am committed to that"*.

The comments from the three participants are long- term intentions that are in line with the definition from Berkvens. et al. (2014); Khoza. (2013b) and Kennedy. et al. (2006). Moreover, long-term intentions can be achieved through a number of people in the teaching valley chain**.** Furthermore, while aims may convey an authoritative message, for example, the aims of the the National Certificate: Vocational NQF L4 is to "equip students adequately for entry into the world of work by providing them with practical knowledge, and skills related to a particular economic or vocational sector" (SAQA Qualification ID50441, 2006, p. 1). P5 remarks are a process aim. The process aim explains how to put the broader aim in action using education and training. Furthermore, this highlights the achievable and social gains. In the same line of thinking, the intention of the process aim is aimed at promoting working strategy for an example the social efficiency and the accomplishment of constitutional mandate through the subject thought process and can only be served through the subject taught (Carl 2002**).**

However, for lecturers to cope with socio-political dynamics presented by aims, they (lecturers) may require critical thinking skills to manage the situation.

The ES&C NQF L4 NCV curriculum, is dual-content. The theory (knowledge component) is biased towards performance curriculum. However, the practical is competence-based guided by everyday knowledge (Bernstein, 1999; Hoadley. & Jansen, 2013). Therefore, understanding the curriculum goals empowers the lecturer to know when to switch from lecturer-centred (instructor) to student-centred (facilitator) approaches. Furthermore, the competence-based approach promotes the what, which are facts based on theoretical knowledge and the how, which is the practical, competences and skills. Therefore, the outcomes are central to the curriculum delivery as they focus on what the student know and are able to do at the end of learning period to meet the outcomes. Furthermore, scholars, Berkvens. et al. (2014); Donnelly and Fitzmaurice (2005) and Kennedy. et al. (2006) concur that outcomes are designed to favour the students' perspectives and intentions as per the intended curriculum (CBET) intentions. Furthermore, for NCV programmes, critical and development outcomes are equally important to understand and nessessary to locate in the programme implementation (Hoadley. & Jansen, 2013; Lolwane, 2001; NCV Subject Guidelines, 2015). The two mentioned outcomes may not have direct impact on the learning outcome processes but are long-term outcomes which may affect the product (student) outlook and functionality in a broader community (lifelong learning).

Furthermore, academics Khoza (2015b); Kennedy. et al. (2006); (Donnelly & Fitzmaurice, 2005); Berkvens. et al. (2014) agree that effective and clear outcomes design must be guided by Bloom Taxonomy (cognitive domain) namely: remembering, understanding, applying, analysing, evaluating and creating. However, for practical training, the psychomotor domain must be considered in order to empower students with effective skills and competences. The psychomotor domain design includes, levels from basic to advance, description and the corresponding action verbs assisting in the guidance to develop outcomes. The first level is imitation described as observing the behaviour of another person and copying the behaviour. The corresponding action verbs are: reproduce, copy and repeat.

Furthermore, the second level is manipulation which is to perform some actions by following instructions and practical skills. The examples of corresponding action verbs are: assemble, disassemble and construct.

The third level is precision. At this level, the student has the ability to carry out tasks with few errors and become more precise without the presence of the instructor. Corresponding action verbs are: show, master and calibrate.

Furthermore, the fourth level articulation, is the ability to co-ordinate a series of actions by combining two or more skills. For example multi-skilling. The corresponding action verbs are: adapt, revise and re-arrange. The fifth level is the naturalisation, which displays high level of performance naturally. Corresponding action verbs are: design, invent and specify (level of supervisors). The TVET College students are expected to operate between level one and three during the institutional training. However, goals should guide the content for successful delivery of the intended/official; implemented/enacted and assessed curriculum.

5.3.4 What content do you teach the Electrical Systems and Construction NQF L4?

Content: Theme 4

Theme 4 intends to capture the views of lecturers as they reflect on topics covered in the content (performance reflections), the practical modules content (societal reflections) and subject knowledge (critical reflections). Therefore, for the above exercise, the following reflections were shared by the lecturers.

Phase One: Reflective activity

P6 remarked, *"The ES&C NQF L4 content is composed of six topics provided in the subject and assessment guidelines and these includes: (1) Electrical infrastructure; (2) Three-phase circuits; (3) Three-phase medium-voltage overhead supply for domestic houses; (4) Inspection of three-phase industrial/commercial installation; (5) Fault-finding and maintenance of three-phase voltage electric circuits and (6) Renewable energy systems. Moreover, the content is covering theory knowledge and practical. Furthermore I am responsible to ensure that all my students do their ICASS and ISAT in order to be resulted at the end of the year."* P5 concurred with P6 on the scope of the ES&C NQF L4 curriculum and remarked*, "Training resources are the main challenge which affect the smooth delivery of the curriculum." Furthermore, P2 also agreed with P6 on the scope of ES&C NQF L4 curriculum and said, "Renewable energy system content is complicated and require relevant resources for effective curriculum delivery."* The above participants were silent on practical module content, projects and subject knowledge during phase one. Therefore, I arranged the phasetwo group discussions for the participants to reflect on content topics, practical modules content, projects and subject knowledge.

Phase Two: Discussions and findings

Content topics (Technical reflections)

"I studied Electrical Engineering (LC) Diploma from the university and obtained practical experience in circuit design, testing and commissioning from different industries I worked for. To teach Electronic Control and Digital Electronics students provides me with an opportunity to plough back knowledge to my community. I am convinced my students will do well in their final examinations as I put more effort in the knowledge built up, revision and practical. The topics covered for my subject are: (1) Alternating current theory; (2) Fundamentals of electronics; (3) Basic design procedures; (4) Binary decoding and loading soft-ware onto a computer; (5) Operating PLCs. My students are doing well in topics (3); (4) and (5) because of being more practical". Remarked P7. In the same line of thinkingas P7, Umalusi Quality Council Report (2012, p 212) remarked that "More practical work should be covered, to promote practical work linked to the subject topics covered in the curriculum, to enhance students understanding of complex concepts". Based on the reflections of P7, it has been revealed that technical education is dominated by technical facts (the what). However, skills and competences (the how) which are achieved through being experienced technically are not privileged. Content mastery knowledge (HW +SW) is determined by your technical qualification and industrial experience while pedagogical knowledge (IW) is determined by academic qualification.

Practical guide content and projects (societal reflections)

As discussions intensified, P 6 remarked, "The year-end students resulting is dependent on meeting the ISAT project requirements and therefore, the practical guide for ES&C is based on ISAT content. Furthermore, training resources is mainly purchased for ISAT making it difficult to explore practical content outside the scope of ISAT." These remarks were further affirmed by all participants and P3 said, *"I am a qualified electrician with vast theoretical and practical experience and therefore, for practical guide I explore the subject guidelines content to identify practical content and develop practical content"*. However, P5 and P6 agreed with P3 idea and P5 said,*"Our practical projects include certificate of compliance testing, installation and testing of three-phase motors and control, repair and maintenance of motor panels. Our challenge is the number of equipment and tools ratio to student numbers and time constraints"*.

Furthermore, the additional challenge is the lack of standardisation across broader TVET College stakeholders and accepted quality standards from credible authorities like the Quality Councils for Trades and Occupations (QCTO) who may further delegate the responsibilities to their respective quality partners (QP). Furthermore, the competence of students at NQF L4 which is an exit point to both higher educational institutes and the world of work cannot be guided by only one assessment (ISAT). The student practical profile report should list all tasks completed and competence status including the ISAT in order to convince the employer stakeholder what the student know and can do. Furthermore, P2 remarked, *"Supplies of the relevant and latest technological hard-ware like Amron do not only sell you equipment but also provide the training manual and the lecturer/ instructor training support. The lack of funding model to address practical is a big obstacle to the proper development of relevant skills and competences of students".*

Findings from the group discussions in this study, reveal that there are no on-site or maintenance projects planned for students. All participants concurred that the ISAT project is done by all students who are learning ES&C NQF L4. The findings also revealed that the Certificate of Compliance (CoC), installation and testing of three phase motors and control, and the repairs and maintenance of motor panels were additional projects done as indicated in the reflections of P5 and P6. However, there is no uniformity of what constitute practical content across multi-campuses of a TVET College beside the ISAT. Furthermore, reputable supplies of electrical and electronic equipment, namely Amron, may add value in providing training manuals and assist lecturers for their training and mastery of their technology's application.

Subject knowledge (Critical/personal reflections)

"While my students enjoy calculations on transformers (topic 4), they are struggling in Electrical Machinery topic (5) especially the DC machines as we do not have relevant equipment and supply to show students these machines in operation, we are only theorising". Remarked P3. P5 interjected, *"DC machines is a specialised field found mainly in automotive engineering, trains, hoists, elevators and mine industry and therefore, continuous staff development is essential for capacity building to address individual subject-content gaps"*. On lecturer development and support P2 said, "*The college request for your personal development plan but take you to training which is not relevant to your needs and furthermore, the Work integrated learning (WILL) is very basic staff and done during vacation weeks making it*

difficult to attend'. Furthermore, P6 remarked, *"The subject-content knowledge is delivered through student learner textbook (prescribed) and lecturers guide only. Students do not have access to computers for further research which I think is very limiting to students' knowledge growth. Apart from students, the mode of content delivery is not digital sensitive caused by the lack of IT facilities resulting to zero growth in the application and knowledge of technological pedagogy by lecturers".*

In the same line of thinking as P2 and P6 above, Rauner (2012) stressed the importance for TVET College lecturers to acquire fundamental vocational pedagogy and specialist knowledge. In addition to the above, lecturers did not comment on their pedagogic capabilities and challenges. The reason for the lack of comments on pedagogic capabilities could be that: TVET Colleges lecturers recruitment strategies prioritises technical qualifications over professional qualification. This result in lecturers being biased towards technical qualification. Remarks from P6, P3 and P1 during group discussions on professional rationale is evidence of this argument. However, participants chosen for this study are all professionally and technically qualified (see Table 4.1).

This study's findings revealed that technical education is dominated by technical facts and the how (competences) achieved through experience. Furthermore, findings from the study revealed that the practical content scope is ISAT dependent yet this is not enough to produce competences relevant for employability. Moreover, lecturers create practical content through identifying practical component from the outcomes provided by subject guidelines. However, there is no practical standardisation across campuses. In addition, there is no authentic body responsible for quality assurance, especially to quality check the practical component in order to create credibility, confidence and trust of potential employers. The Quality Councils for Trades and Occupations (QCTO) could be a solution to this predicament and hopefully may delegate responsibilities to their quality partners (QP. However, the TVET College programme for example the Electrical Infrastructure Construction, needs to be accredited by SETA in order to get quality assurance services from the QP. Training without credible quality assurance compromises the final product (Cedefop, 2015; Cornford, 1997; Dai & Nguyen Quang Viet, 2012; Deißinger, 2011). Furthermore, there is no on-site projects for students. On-site projects would give students opportunities to practice team-work, problem-solving skills and communication (NCV Subject Guidelines, 2015; SAQA Qualification ID50441, 2006). Moreover, research findings revealed that lecturers' personal development are not given priority and the content delivery mode is not sensitive to digital technology. Furthermore,

participants reflections revealed that there is no support available to the lecturers to handle complex topics caused by the lack of subject matter specialists. However, to circumvent the subject matter content specialist, it may be advisable for the academic board of the college to consider appointing subject matter specialist to assist lecturers improve their subject-content knowledge. Hopefully this may improve the delivery of ES&C NQF L4. Curricula enactment is the domain of lecturers therefore, the next topic addresses the lecturers' roles in the teaching of ES&C NQF L4.

5.3.5 How do you perceive your role as an ES&C NQF L4 lecturer?

Teacher role: Theme 5

Participants were expected to reflect on the following:

- Teacher-centred (instructor) (Technical reflection)
- Learner-centred (facilitator) (Practical reflection)
- Content-centred approach (assessor/researcher) (Critical reflection)

Phase One: Reflective activity

Reflecting on the reflective activity, P4 said," *I see myself as information interpreter, facilitator, an assessor and moderator."* Furthermore, P6 remarked, *"At times I use teacher-centred approach for emphasising the content knowledge. In addition, I use content-centred approach in order to assess the students understanding and therefore for me to fill in gaps."* These reflections were based on the reflective activity and only two participants responded citing ISAT commitment schedule as the main reason they were not able to reflect to the reflective activity. The two participants reflections did not cover all the three propositions. I therefore arranged the group discussion (Phase Two) meeting at the participants campuses.

Phase Two: Group discussions and findings

P5 shared how he organised his ES&C NQF L4 group for assessment and said, "*In a group of three, mention four electrical tests and one mechanical test conducted on the three phase-motor, also give the names of the testers used and the correct expected readings. You can refer to your textbook and other relevant electrical books".* The reflections from P5 presents the lecturer practicing as an assessor.

Furthermore, P6 remarked, "*I spent fifteen minutes explaining and showing the groups how three-phase motor testing is conducted. I then moved around the groups monitoring how they conducted the tests and assisted those who had challenges (*facilitation) *however, the shortage of testing equipment results at me doing more talk in order to save time (*instructor). *In the last ten minutes' students were instructed to pack up tools and get ready for the next lesson."* Other participants echoed the challenge of resources which upset the role of the lecturer and the teaching plan, which may result in the intended and enacted curriculum not being achieved.

P2 interjected," I *conduct fifteen minutes' formative assessment on Thursdays and request students to exchange scripts and self-mark. Furthermore, I request students to refer to other books for solutions of all mistakes done in the test." (assessor). P1 and P3 concurred with P2.* However, P3 remarked**,** *"For the practical formative assessment, I group students to perform practical activities and monitor how much each student contributes in the achievement of set outcomes using the rubric so that students become familiar with the marking procedure used when conducting ISAT".* Other participants appreciated that reflection and raised the time as a concern for quality training.

*In same line of thinking as P3 above**,** P4 remarked, "To prepare my students for the external summative assessment, I teach my students to understand and able to handle low order, middle order and high order questions. This is achieved through making reference to Blooms cognitive domain. The final summative assessment requires 30-40% knowledge and comprehension, 50-60% application and lastly 0-20% high order questions".* All participants shared P4' view.

Findings

TVET College programmes especially the Engineering, for example the ES&C NQF L4, is a dual-content. The dual-content subject is made of theory which is a knowledge component, and the practical which is the skills and competence component assessed through ISAT. Furthermore, programmes are governed by the principle of Competence Based Education and Training (CBET) and therefore biased towards student-centred approach. The findings reveal that lecturers apply all three approaches namely lecturer-centred and content-centred and student-centred in their teaching practice. Teaching theory and practical (preparing students for national summative assessment) warrants the application of the three proposed approaches. Moreover, the lecturers should understand their roles in order to effectively deliver the intended, enacted and intended curriculum.

Furthermore, during the group discussions, lecturers displayed understanding of the three approaches and the evidence is in their reflections, where they shared knowledge of different approaches and their application in the management of workshop training (instructing), multi-purpose theory class and the assessment of students thereafter. Furthermore, findings reveal that participants focused on the content-centred approach during group discussions (see remarks from P2; P3 and P4) above.Therefore, based on the above reflections from the participants, the content-centred approach carries huge responsibilities especially as it involves formative, peer and summative assessments, which are critical in the preparation of students for progression. However, continuous feedback is important because it helps the students to rectify mistakes while the lecturer modifies his/her approach for effective teaching (Aranda & Yates, 2009; Van Manen, 2008). Moreover, the critical outcomes as captured in the NCV Subject Guidelines (2015), recommend that students should be developed and encouraged to solve problems using content. In addition, they must be supported to use media centres to collect information as this will boost content-knowledge. The major concerns with the TVET College campuses is the challenge of digital migration and broad-banding (internet connection) state of readiness in campuses, which are making research (content-centred approach) difficult for both the lecturers and students. The other dominating teaching approach revealed in the participants' reflections is the student-centred approach see remarks from P6).

Moreover, P4 made the following remarks during the group discussions, *"My class is a multi-purpose by design. And the sitting arrangement design allows students to sit in pairs to promote pear-learning, group-learning and the exploration of ideas. The pairing setting encourages the pairing of gifted and slow learners but I take caution to ensure that the gifted students do not dominate the discussions. I move around monitoring and facilitating and ensuring there is group cohesion and students work effectively with one another."* (critical outcome). P2 and P3 agreed with P4. This study findings reveal that teaching a dual-content, the ES&C NQF L4, requires the lecturer to be able to create synergy between the planned, enacted and the intended curricula. Moreover, the choice of an appropriate teaching role is crucial for effective curriculum delivery. The NCV curriculum (ES&C NQF L4) being competence-based and dominated by outcomes, requires both the students and the lecturer to understand the CBET underpinning principles.

The purpose of NCV curriculum is to develop students' competences, skills, values and knowledge required for employment, and moreover, to articulate (allow for vertical and horizontal mobility in the educational system) to higher institutions of learning (DoE Minister

Pandor, 2006; SAQA Qualification ID50441, 2006). Therefore, content knowledge is very crucial for students' admission requirements as well as academic skills to cope with academic and technical complexity. Moreover, to ensure that the NCV purpose is achieved, lecturer-centred and content-centred approaches must be adopted by the lecturers (refer to reflections from P5 and P4 reflections during group discussions}. Furthermore, participants made the following remarks in support of the lecturer-centred approach.

P5 remarked, "I instructed the ES&C NQF L4 class to refer to question three the fault finding. This question requires students to outline the procedure followed in fault-finding practice. I set up students to debate their responses and there after we all collectively analysed the question (fault-finding) to find possible causes of faults and solutions." P6 interjected, "Students struggle to deal with content-knowledge application, analytical and evaluative questions. I spend three quarter of my subject time discussing and analysing questions together with students, helping them to understand the cognitive domain implications on the questions". Other participants echoed P6 moreover, they acknowledged the challenges faced by the students. However, P4 remarked, " This research project has added value and insight to my understanding of curriculum. For me, lecturers teaching ES&C NQF L4 curriculum should be exposed to the ten spider- web curricula concepts as part of staff development." Reflections from P5 and P6 indicate the importance of lecturers noting academic challenges students face and thereafter putting the necessary interventions strategies in place. Moreover, challenges mentioned by P5 and P6 above, require lecturer-centred approach. In line with the above, cognitive domain involves performance curriculum which is based on international standards and research. The lecturer-centred approach puts the lecturer on the centre stage to control learning and assist students to achieve success in their learning and ESASS.

Over and above, during group discussions, participants revealed understanding of their different roles and the importance of the professional conduct and work ethics (Mchunu & Msibi, 2013; Veronesi & Varrella, 1999; Webb, 2009). Furthermore, this study revealed that the multi-purpose class design encourages the lecturer (remarks from P4) to move between students to support those who are struggling without slowing down the fast learners (Stiggins, Arter, Chappuis, & Chappuis, 2007). In addition, this study findings also revealed that participants (lecturers) benefited from this project by understanding the significance of each lecturer-role in the teaching of ES&C NQF L4 NCV curriculum and the ability to acknowledge the importance of relevant approach when the need arises. On the same line of thinking, similar

to lectures' roles, it is important to note activities used to teach and train ES&C NQF L4 curriculum.

5.3.6 Which activities are you using to teach and train ES&C NQF L4 curriculum?

Activities -Theme 6

Participants were expected to reflect on the following propositions

- Informal activities: Formative (Societal reflection)
- Formal activities: Summative (Professional reflection)
- Practical module training (ISAT): Summative (Professional reflection)
- Supportive activities (Internal continuous assessment (ICASS): (Critical reflection)

Phase One: Reflective activity

P5 made the following remarks, *"I instruct my ES&C NQF L4 class to work in pairs and discuss instrument transformers used in high tension (HT) circuits and thereafter answer questions on activity 3.1 from theory book in their workbooks. Thereafter, I instruct students to exchange answers with one another pair and mark each other's work."* (peer assessment). However, P6 added, "*I instructed my ES&C NQF L4 class to engage in the individual activity by reading with understanding the synchronisation of the alternator in their theory textbook on activity 1.3, then using own words answer all activity questions. When students finish the activity, I ask them to mark their own work according to given answer sheet."* (self-assessment)

P3 remarked, "I give my ES&C NQF L4 class official tests using the previous examination papers to make them familiar with the external examination style and furthermore, to create learner progress profile and academic readiness record." (formal activity**)**

On practical training, P6 remarked, "*I follow the ISAT documented activities as part of students' preparation for the ISAT examination"*

Participants reflected on informal and formal activities for theory with P6 reflecting on practical training activity during Phase One. Participants did not reflect on formal practical activities and internal continuous supporting activities. Lecturers were not aware that formal practical activities is the final ISAT assessment. However, group discussions will provide an opportunity to know why participants did not reflect.

Phase Two: Group discussions and findings

However, during Phase Two participants reflected on all proposed teaching activities, which indicated a shift from Phase One reflections. Participants reflected as follows**,** *"I use subject guidelines to show students the importance of learning outcomes and its relevance for summative assessment and ESASS (external summative assessment) and therefore encourage students to align lesson or activities to a relevant learning outcome topic."* remarked P1. Other participants agreed with P1. P3 interjected, " I *give classwork and homework using Electrical Systems and Construction NQF L4 revised curriculum as informal tasks to students however, for official reporting purposes and students' progression, I use control tests, assignments and examination. These summative activities are scheduled annually and captured in the ICASS plan"*. All participants agreed with P3. However, P1 remarked, *"In order to inculcate skills, knowledge, values and attitudes to students, long time is required (entire year duration) and students are continuously (internal continuous activities) given activities to support them to master the SKVA and the learning outcomes set to achieve"*. However, P4 reflected*, "For effective internal continuous activities, I use projects, tests, assignments, role-play, case studies and investigative strategies (fault-findings). However, for cognitive development, I use exams, reports and essay as my tools"*. Furthermore, P5 remarked, *"I instruct my ES&C NQF L4 students to form a 4-member team in order to erect a nine-meter wooden pole for domestic installation purposes considering the acceptable standard depth width of the hole (practical activity)." Furthermore, P5 added, "To enhance students' skills, I encourage students to imitate what I demonstrated, manipulate the practical activity until the student is comfortable with the activity and lastly to strive towards perfection especially when they practice ISAT activities which is examinable at the end of the year. To achieve perfection, for psychomotor activities, I make sure that I do direct observation and request students to submit products manufactured as evidence confirming my judgement."* All participants echoed P5 and P6 said, *"This approach may help to standardise quality of training." Furthermore, P5 added, "I have a standing arrangement with Drakensberg Hydro-scheme (water-fdriven ESKOM Power station) to book our EIC NQF L4 students for the educational excursion. This excursion exposes students to how electricity is generated (conversion of mechanical energy to magnetic energy and lastly to electrical energy). Students get the opportunity to be lectured by experts how electrical energy is generated, transformed (medium voltage to extra-high voltage) synchronised and then transmitted to EHT lines (grid network) thereafter to different parts of the country".*

Participants reflections revealed that informal activities (formative) help students to understand their academic weakness, however, pairing them as they engage in activities promotes a learning community. Additionally, there is a danger of the fast learning students dominating the slow ones (Stiggins et al., 2007). However, to circumvent that, different roles are assigned to these students that they are supposed to account for to the entire group. Roles include conducting research for the group on selected themes; peer support and presentation of complex themes to the group. Furthermore, participants overlooked the importance of the linkage between informal activities, which is used to develop and prepare student for formal assessment readiness and grading, formal activities used to provides students' progress academic records and the internal continuous activities which continuously support students to improve their performances. However, peer and group feedback may result in conflict among students especially if they are not agreeable with the answers. Furthermore, the analyses of data based on summative and ICASS activities may help lecturers comprehend students' academic behaviours so that lecturers areable to decide which activities to use for an effective programme (Prinsloo & Slade, 2013). In the same line of thinking , Taole (2013) contends that teaching activities may determine the success or failure of the curriculum. However, learning/teaching resources should match the curriculum implementation plan.

5.3.7 What resources are you using to teach ES&C NQF L4 curriculum?

Learning resources: Theme 7

Phase One: Reflective activity

P4 reflected, *"I use multi-purpose classroom, whiteboard, erasable markers, flip charts, digital projector, videos, computer, MS Power Point soft-ware, textbooks and training consumables"*. Furthermore, P6 said*," I use hand tools, power tools, testing equipment, pedestal drilling machine, portable grinding machine, tools and material store-room, AC electric motors, three phase power supply, electrical training consumables, training equipment, simulated controlled motor panels, computer, digital projector".*

The participants were expected to reflect on the three propositions, hard-ware; soft-ware and ideological-ware, considering the corresponding reflection levels. The participants reflected on hard-ware and soft-ware propositions and were quiet on ideological–ware yet teaching is not complete in the exclusion of ideological-ware (Khoza., 2013a) . Hard-ware (HW) and soft-ware (SW) are tangible and the Ideological-ware (IW) is intangible (Khoza, 2015a, 2015c).

Furthermore, Khoza (2018) asserts that, IW resources includes ideas, and theories involved in the use of HW and SW. Moreover, IW involves educational theories lecturers acquired from the university. Additionally, lecturers are able to reflect on HW and SW resources because they are tangible however, are not able to reflect on IW because it is intangible and demands academic orientation. In the same line of thinking, different studies (Khoza, 2015b; van Manen, 1977a, 1995; Ward & McCotter.. 2004) revealed that, in spite of reflections being important as they help lecturers understand curriculum, most lecturers do not reflect on their teaching practices of the resources that underpin their curricula. Similarly, participants did not reflect on the IW proposition but reflected on HW and SW.

Furthermore, on the question of how facilities cope with learners to lecturer ratio, P6 said, " There are more learners than the training facilities, equipment's, and tools resulting in learning activities being compromised." Additionally, P4 said*," The current ratio of students to facilitator is 40:1 (based on current students' enrolment) while the norm is 32:1 for the classroom environment. The ratio norm for the workshop environment is 20:1 and this practice is against the Occupational Health and Safety Act (OHSA) where the norm is 15:1."* Realising that participants were not able to reflect on the propositions, I contacted them (participants) from their respective campuses to arrange Phase Two group discussions.

Phase Two: Group discussions and findings

Participants reflections during phase two indicated an improvement and this is how they responded on the three propositions (group discussions).

P2 said *"Effective vocational education is about matching training resources with your education training plan. For my campus, resource procurement to achieve our educational goals is sent punctually but long time taken for orders to be processed despite being sent promptly. The worse is that orders are cut badly to suite the college budget rather than the educational plan. Ultimately this compromises learning and training plan and further work against the social efficiency principle which promotes students' participation in the economy".* All participants agreed with P2 comments. In support of P2, P6 remarked, *" The Supply Chain Management (SCM), purchase (procure) wrong items compared to what was ordered."* P1 added, " *The cutting of items especially the consumables, impacts negatively on the quality training."*

In line with the resources, P3 remarked, *"Textbooks for lecturers and students are commonly ordered in time and arrive promptly. The main worrying factor is that the library resource centre does not have variety of ES&C NQF L2-4 books except prescribed books for Report 191. Moreover, the availability of wider range of electrical learning resources help students to broaden their trade knowledge."*

In addition to the above, P4 said, *"Material requisitioning and control are based on ISAT needs as well as ISAT preparations time and therefore any delays in the delivery promptly has huge implication to ICASS and ISAT which is compulsory for student to have for resulting purposes*" As part of group discussions, P6 remarked, "*Grouping students in a task, helps to eliminate resources problems."*

In addition, during the group discussion, P2 remarked, *"My students are doing tubing and wiring of single- phase domestic installation. The installation involves lighting circuits, socket outlets, stove and geyser circuits and the distribution board. Students are to position all components as per the drawing measurements plan given and must comply to SANS regulations. Students shall work in pairs per cubicle (ten cubicles provided as the workshop design). The main concern I am having is the shortage of resources which compromise my training plan and make it difficult to complete the project in time."*

Responding to the question on how facilities cope with students: resources: lecturer ratios and what impact these have on the final product quality, P4 said*, "Currently the ratio of students to lecturer is 40:1 while the classroom norm is 32:1 and workshop environment being 20:1. This results to poor time management, poor organisation of workshop activities, time taken in the distribution and collecting of tools, loss of focus by students, interruption by students, students not completing tasks effectively, lack of consumables resources material and equipment. All the above results to the year plan being not achieved*". The above was echoed by P6 when he said, *"There are more students than the existing infrastructure and equipment hence improvisation is always the case thus disadvantaging some students likewise the final product is equally affected"*. Remarks made by both P4 and P6 were echoed by P2, P5, P1 and P3.

For the ES&C NQF L4 curriculum (dual-content), training resources are key in order to achieve learning and training plan objectives. Therefore material availability concerns raised by the participants (P5, P3, P4, P6 and P2) are a worrying factor which management should address. Moreover, studies conducted by (Dasmani., 2011; HRDCSA TTT Report, 2014; MTT Final

Report, 2013), revealed that resources are a key challenge to ensuring the synergy between the planned curriculum, the implemented, and the attained curricula. Furthermore, the students number supersede the facilities and makes it difficult for facilitators to cope (P4 and P6).

This study revealed that material procurement turn-around time and the cutting of items regardless of their importance, are of great concerns to the participants. Moreover, this seems to be a common challenge among TVET College campuses who participated in this study. Participants are of the opinion that their space is not respected by the Supply Chain Management (procurement). Furthermore, lecturers maintain that wrong items are ordered based on the lack of technical knowledge from the SCM. I suggested to the group that a catalogue from the supplier showing items should be used instead of writing only items names. Using catalogue details may reduce the number of wrong items received and the turn- around time. Apart from material related challenges, participants were able to reflect on the three propositions (P5, P2, P6). Moreover, participants displayed positive energy to impart knowledge to students through student-centred, and lecturer-centred approaches as circumstances demand.

However, for the dual-content, applied engineering technology in education (AETIE) training resources are key components, for skills transfer to happen effectively. Moreover, the AETIE is driven by technology of education (TOE) for effective learning and teaching. Furthermore, scholars such as Khoza (2012);Khoza (2015a), and Criticos et al. (2005) agree that IW resources are what communicates teaching and learning. Additionally, the above academics concur that resources are grouped into hard-ware (HW) (machines equipment and tools, soft-ware (SW) (resources that display information through hard-ware, transparencies, CD, training manuals, YouTube, Motor Speed -Drive Soft-ware, TV, DVD) and lastly the ideological-ware resources (IW) (ideology and vision behind the curriculum, curriculum ten learning/teaching signals, theories and thoughts involved in the use of HW and SW) (Khoza, 2018). The findings of this study revealed that participants were using resources without acknowledging the resource categories and furthermore, HW and SW are more dominant in their reflections. The IW was used in questioning the scarcity of training resources and its late arrival caused by the SCM, and in addition teaching methodology approach used by P6 in teaching the practical lesson. Participants could not link the curricular learning signals concepts to IW. Participants' understandings of HW, SW and IW is limited to ICT and lacks broader curriculum implications yet these learning resources are key to any curriculum implementation. To circumvent this challenge, staff development programme in this area is crucial. However, Khoza (2013) and

Khoza (2015c) contend that effective teaching is more about IW. This suggests that for implemented curriculum to achieve the intended assessed curriculum, IW must be given priority in the delivery of curriculum. Moreover, teaching/learning and training should take place in a conducive and acceptable environment. Therefore, the next topic focuses on the learning space and time.

5.3.8 Where and when are you teaching ES&C NQF L4

Learning Location & Time: Theme 8

During Phase One (reflective activity) only two participants answered the reflective questionnaire, other participants cited ISAT commitment and strikes disturbance as reason they could not complete the questionnaire. P6 reflected as follows, *"I teach theory and practical in my workshop from Monday to Friday and sometimes extend to Saturday due to the lack of sufficient infrastructure and time constraints"*. However, P4 said*, "I teach both theory and practical in my multi-purpose classroom guided by the time- table given to us at the beginning of the year".* Participants were expected to elaborate on their workshop accreditation status and thereafter present their perspectives based on the three propositions, the classroom (professional reflection), workshop (practical reflection) and lastly the computer laboratory (critical reflection). Participants responded to the two propositions, the classroom and workshop. No participant reflected on the third proposition, the computer laboratory. I therefore arranged the group discussion meeting with the participants.

Phase Two: Group Discussions

Classroom (Technical reflections)

During group discussions, P4 remarked as follow on classroom, "*My class is a multi-purpose by design, the centre stage provides space for desks where students sit in pairs to promote peer learning, group learning and exploring of ideas. Furthermore, the classroom space is demarcated with a walkway to create workshop space".* This remark was echoed by all participants but P5 further said, *"Moreover, training models are displayed on the work-benches for students to see and in addition, educational charts and posters capturing important concepts are pasted on the wall to motivate students".* Furthermore, P3 interjected, "*My classroom is well ventilated with sufficient lighting, equipped with white board, flip-charts and overhead projector which I use interchangeable to teach EPP NQF L4 subject"*. In addition to above, P6 remarked, "*Important safety regulations, classroom rules, discipline and assessment*

scheduling are pasted on the wall to remind students important academic events". P2 said, *"I teach ES&C NQF L4 theory in my classroom, assist students as they do their class work activities and further use the classroom to conduct summative assessment."* Further to this, P1 remarked," *Teaching a diverse group of Grade 9,10,11 and 12 have their fair share of challenges. Class discipline, absenteeism and lack of respect to mention the few*". Other participants agreed with P1 and said they hope the college management will develop policy on absenteeism and discipline and thereafter implement such policies. The participants did not reflect on the size of their mega multi-purpose classrooms nor the maximum students' capacity that may be accommodated. Moreover, there was no mention of digital inclined technologies used for example the blended learning.

Workshop (Practical reflections)

P2 remarked as follows, *"My workshop is powered with both three-phase (380VAC) and single phase (220 VAC) in order cope with industrial and domestic power requirements to be able to serve ES&C NQF L2-4 training needs. Furthermore, the workshop is provided with a store-room for safe keeping tools, testing equipment, training equipment like motors and control gears, however, consumables are purchased as per ISAT needs".* P5 intercepted and said, *"Work-benches, drill press and fixed grinder and other electric portable tools are essential for the development of students"*. P6 added, "*Stork control and equipment register is used for continuous monitoring of resources".* Other participants concurred with the above reflections however, renewable energy solar panels, wind mills, medium voltage transformers and switch gears are problematic to get which affected the practised and attained curriculum. P1 raised a concern that *"Shortage of training resources and the student number ratio compromises the training plan thus leading to poorly trained student with less chances for employability"*. On the issue of workshop accreditation, all participants concurred that their workshops were not accredited. Furthermore, the reflections of lecturers on topics covered in the ES&C NQF L4 revealed that other concepts like medium voltage transformers, sectionaliser (an HT electrical equipment responsible for diverting electric power), switch gear (Ring main unit) and renewable technologies were very abstract. However equipment are expensive, digital models could be a solution. Therefore, the next paragraph present lecturers' reflections on computer laboratory application in the teaching and learning of ES&C NQF L4 and other Electrical Infrastructure Construction core subjects NCV curriculum.

Computer laboratory application in the teaching/learning of ES&C NQF L4 (personal/critical reflections)

For this sub-theme, computer laboratory applications imply all information technologies applied to enhance teaching/learning and training of students namely computers, soft-ware, blended learning, YouTube webpages, internet access, digital projectors and printers to name the few. Therefore, to understand how effective e-learning at public TVET College campuses is, participants shared their views as follow.

"Computer laboratories access are limited to Life Orientation (LO), Computer Programming and Engineering Graphic Design (EGD) classes and time tabling is not accommodative to ES&C NQF L4 subject. ES&C NQF L4 subject-content requires students to research on YouTube webpage for most of the abstract themes" remarked P5. Furthermore, P1 said, "*Prescribed textbook content may be enough to prepare students for the final summative assessments but not enough for preparing students for the world of work. Therefore, e-learning is a solution for self-driven student thirsty for knowledge and skills and I wish our TVET College subscribed to the notion of migration from analogue to digital as captured in the 2030 National Development Plan"*. Participants echoed the sentiments raised by P1 and P5 remarked*, "Our college is in the process of finalising the optic fibre connectivity process so that both students and lecturers can access internet"*.

None of the participants reflected on their technological pedagogic development status. Furthermore, this study findings reveals that the TVET College is not able to provide internet and Wi-Fi to students and lecturers because of the connectivity challenge. Moreover, this study findings reveals that there are no stand-alone computer laboratories for students to conduct research work. Moreover, the resource centre ie. libraries are not equipped with sufficient computers to cope with students' numbers. However, access to the digital body of knowledge which meets the labour market, and Higher Education Institutions needs is essential for economic developing countries like South Africa (Loliwe 2001).

To realise access to digital body of knowledge, the Government intends to provide broadband coverage by establishing core Points of Presence (POPs) to all households including educational institutions by 2020. This is part of the country's initiatives to address connectivity challenges for students,' lecturers, and the general public to access Wi-Fi and internet (PICC Secretariat, 2012). For TVET College, students will be able to access the internet and thus be able to conduct research for their subjects and personal development.

Furthermore, the study findings also reveal that diverse group of Grade 9.10, 11 and 12, are ill-disciplined, and frequently do not attend classes and moreover, are dis-respectful. However, attendance policy may help is curbing absenteeism.Moreover, it has been revealed that the classroom is mainly provided with white board, flip charts, OHP, digital projectors and other digital support equipment which add value in the teaching of ES&C NQF L4. Scholars like Gayeski. (1993); Mayer (2001); Gilakjani (2012) and Khoza (2013), concurred that, vocational based students learn best through seeing and touching rather than using hearing sensor alone. Having classrooms, workshops and computer laboratories as resources is not enough in the absence of time.

5.3.9 Time allocation

Phase One: Reflective activity

Time allocation is an important component required in the teaching and learning of the dual-content subject for an example the ES&C NQF L4 curriculum. This section therefore, presents participants reflections on time. During the reflective activity, P6 said, "*Time allocation for ES&C NQFL4 is fifty-five minutes per day scheduled for four-days in a week and one day is a double period which we use for practical. Furthermore, I teach from Monday to Friday but sometimes use Saturday to compensate students number ratio to facilities, the lack of infrastructure, equipment and time constraints"*. The reflections from P6 implies that officially time allocation is two-hours, twenty-minutes per week of teaching and learning for both theory and practical. Furthermore, P4 remarked, *"Our teaching plan is a seven- subject time-table covering four vocational and three fundamental subjects. The time table is groups based and time allocation is two-hours ten minutes per day two times per week and in total four hours twenty minutes. This time allocation covers both theory and practical".* Participants were expected to give detailed time allocation informed by three propositions (classroom, workshop and computer laboratories) and their respective reflection levels. However, participants could not explain how time allocation is spread among classroom, workshop and computer laboratory. I therefore arranged a group discussion session.

Phase Two: Discussions and findings

During group discussions P5 remarked as follows on time allocation, *"For our campus, thirty-two students are recruited and placed in the Electrical Infrastructure Construction (EIC) subjects and these students are further split into two groups for vocational subjects and*

workshop this is done to ensure that compliance of lecturer to students' ratio is accomplished. The time allocation is informed by a forty-week plan and subject guidelines topics time allocation (110hrs of teaching and learning per year). Our time- table is allocated fifty-five minutes per day four times a week (2hours 20 minutes) and one double period (1hour 10 minutes) in one of the days which we use for practical training. Practical training demands continuous practice to promote coordination between the mind and hands therefore time is not enough, and it compromises the curriculum vision and product quality". Furthermore, P3 remarked, *"I use my multi-purpose classroom to teach and demonstrate abstract theoretical concepts for students to understand facts and thereafter let students practice what I have demonstrated (student-centred approach) to them. During theory classes, we are afforded few hours to reinforce theory through demonstration. There is sufficient time for theory, but more time is needed for effective alignment of theory and skills."*

I asked the participants whether time required for theory, the what compared to practical the how (Khoza ,2016) is the same considering the equal spread of time. P1 said, "*To develop an artisan (competent person) you need years, part of which spent in a quality workshop under competent trainers and industrial exposure (trade-test requirements) as opposed to hours needed to explain theoretical concepts which is done in a classroom. Therefore, to develop competences, values, skills and students' practical confidence, sufficient and appropriate training resources, equipment and enough time* (Hoadley. & Jansen, 2013) *are essential*." P2 and P4 agreed with P1. Furthermore, P4 remarked, *"Workshop training time is reduced by time taken to distribute tools and material to students and also time taken to take stock of what was issued. Moreover, practical is done only once a week to allow smooth flow of groups. The quality of time spent is not enough to develop competences, skills and values to meet prospective employer expectations".*

On the last proposition (computer laboratories) P5 said*, "Our college is slowly migrating from analogue to digital. The vocational subject students don't have access to computer labs as labs are fully occupied with different groups to learn Life Orientation. The resource centre (campus library) have few computers but there is no internet. The college is working on accessing connectivity so that students may access internet. Lecturers are using their modem and personal laptops to access internet and buying data bundles is expensive. Apart from the above, there is a huge need to transform some of the lecturers from being semi digital refuges to digital natives in order to make them effective user of digital technology"*. Other participants echoed remarks from P5. P6 added, "*Other subject topics demand that students use web-pages and*

YouTube to further explore subject-content to be able to respond to formative group activities. However, while other students may have access to internet from their smart phones, the disadvantaged students may not be able to afford data bundles even though they may have smart phones capable to perform sophisticated operations. My campus is located in a semi-rural environment, I had to buy a router to improve the quality of the signal in order to surf information for my students. The surfing of information is time consuming (sometimes may take days to complete) and time allocated in our time- tables is not enough. Both the router and data bundles are expensive and the college does not compensate me."

This study findings reveals that time distribution across all seven subjects based on time-table provided, is the same. For an example, Life Orientation is a ten-credit subject but receives the same time allocation like twenty-credit subjects. Furthermore, non-practical subjects like English and Mathematics also get the same share of time distribution. The core subjects including ES&C NQF L4 also get the same share of time apart from being dual-content. Therefore, time need more attention and possible policy review for effective delivery of the ES&C NQF L4.

Furthermore, this study findings reveal that there is no consistency in time distribution. This argument is based on the reflections of P5 and P4 who assert that time is two-hours twenty minutes (P5) and four-hours twenty minutes (P4) a week. For P6 and P5, additional time is achieved through using Fridays and Saturdays. Moreover, this study findings also reveals that time allocation and training resources are a major obstacle in the delivery of the intended, practiced and attained curricula at Micro-level. Furthermore, reflections of the participants reveal that lecturers are using their own modems and laptops to access the internet and web-sites recommended for ES&C NQF L4 students. In the same line of thinking, Khoza (2015c) posits that internet resources can connect a person to all corners of the world and bring education to students living venues. Competent lecturers may be hired to implement the intended/official and enacted curriculum however, the attained curriculum is depended on quality assessment.

5.3.10 Assessment and Quality Assurance

Theme 9

The assessed or attained curriculum which is the third layer of the curriculum, determines whether there is a synergy between the intended and the enacted curricula (Hoadley. & Jansen,

2013; Van den Akker et al., 2009). Furthermore, the ES&C NQF L4 NCV curriculum is competence based on the CBET model and seeks to develop knowledge, skills, values and attitudes of students in order for students to articulate to HEI and the world of work (DoE Minister Pandor, 2006). However, summative assessment includes, Integrated Summative Assessment (ISAT) for assessing skills and competences and furthermore, the Internal Continuous Assessment (ICASS), and lastly the External Summative Assessment (ESASS). For this study, participants had to reflect on assessment of learning (summative) (professional reflection), assessment as learning (practical reflection) (peer assessment), and assessment for learning (formative-cum-summative) (critical reflection) based on professional-cum-societal reasons.

Phase One: Reflective activity

P2 responded as follows: "I prepare my ES&C NQF L4 students for external National examinations through helping them in revising previous years question papers and assign them short informal test weekly. The students test scripts are marked by their peers using the memorandum and the results are not recorded". However, P6 added, *"I use informal assessment such as class activities from the textbook together with homework to measure the students understanding and for formal assessment, I use controlled test and summative assessment which I record and keep in my portfolio of assessment (PoA)."*

Participants reflected on formative (informal) assessment and further added summative assessment, the theory (knowledge) component. However, ES&C NQF L4 is a dual-content, covering knowledge (theory) and skills (practical). Participants were quiet on integrated summative assessment (ISAT). Furthermore, there was no mention of internal continuous assessment (ICASS).

Phase Two: Discussions and findings

During Phase Two, group discussion session, participants reflected on assessments areas and their reflection levels**.**

P6 made the following remarks during discussions, "*My ES&C NQF L4 students are assessed through individual activities, pairs and group activities. However, in the completion of the activities, students are requested to exchange the scripts with their peers and mark according to the memorandum and guide provided by the lecturer. Scripts are thereafter given back to owners to see mistakes and progress. The marks are not recorded since this is informal test."*

Other participants agreed with P6. However, P4 interjected, "*I give my students home work on daily basis and a short class test once a week for them to check if they are meeting the learning outcomes standards. The test is marked among themselves"*. This study findings reveal that assessment as learning provide both students and lecturers an insight of how students understand the concepts being taught and learnt. Furthermore, it provides an indication of the students' readiness for the summative assessment. Moreover, the feedbacks guide the lecturer to change the strategy in order to improve the intended outcomes.

As part of group discussion, P5 added, "*Internal continuous assessment (ICASS) schedule demands for five assessment tasks to be done annually for all core subjects including ES&C NQF L4. Furthermore, ICASS marks are requisites for students to get their official examination results."* P3 added, *"The ICASS tasks are spread across three terms, two in first and second terms and lastly the trial examination done during the third term. Moreover, ICASS contributes 50% of the final marks and therefore all students should have full complement of ICASS marks."* P2 interjected, "*Assessment instruments for ICASS includes projects (ISAT), tests, assignments and investigations (three phase fault findings)."* All participants concurred with P3 and P2. Furthermore, P6 added, "*For students to be ready for tests (summative), informal assessment activities must be conducted by the lecturer and the formal assessment schedule is sometimes at the discretion of the lecturer and campus management due to campus political dynamics especially caused by NSFAS protests".* Group discussion findings reveal that ICASS combines both the formative and summative approaches.

For ICASS administration, lecturers, being directly involved in the teaching and learning processes, are responsible for making decisions on the content of the assessment tools namely the tests, project scope, assignments and investigations. Moreover, subject lecturers from all campuses teaching ES&C NQF L4, form subject committees and are further guided by the assessment guidelines plan, to develop ICASS implementation plans (Mahlobo, 2016). More importantly, the ICASS should address the development of skills (driven by societal reasons), knowledge (professional reasons),and values and attitudes (personal reasons) to empower students to achieve the assessed curriculum for personal development and employment opportunities. To achieve that, for ES&C NQF L4, core subject, the ICASS is made of five tasks distributed across three terms (DHET ES&C L4 AG, 2015; Mahlobo, 2016). Moreover, ICASS marks are compulsory to all students in order to be resulted (means DHET ICT management system cannot release the final examination results for the student if ICASS is outstanding) and in addition, it makes 50% of the final marks. However, for ES&C NQF L4

students to be full resulted at the end of the year, ICASS (driven by personal reasons), ISAT (driven by societal reasons) and ESASS (driven by professional reasons) are compulsory. ICASS is linked to assessment for learning because the lecturer makes personal decisions in addressing the short-comings of the students' development while learning and training is in progress, and take corrective measures for the future (Hoadley. & Jansen, 2013; Khoza, 2015b; Khoza., 2013b). Furthermore, assessment for learning in the context of trial examinations during third term, prepares students to face the external examination. ICASS marks are forwarded to DHET mid-fourth term, after moderation by DHET and Umalusi Quality Assurance. Furthermore, marks are captured in the lecturers PoA for records purposes. Therefore, based on above line of thinking, ICASS is driven by personal reasons that assist to create an environment which help lecturers and students to construct their own unique identities (Ngubane-Mokiwa & Khoza, 2016). The success of ICASS is dependent on the commitment and dedication of lecturers at ensuring that these assessments add value to the development of students.

During group discussions, participants reflected on the importance of students to be ready for the external summative assessment (ESASS). P5 made the following remarks*, "The External National Examinations for ES&C NQF L4 is a direct responsibility of DHET starting from the exam paper setting, paper moderation, hiring of the chief examination centre and other personnel."* P2 added, "*Our job is to prepare students to be content knowledgeable and confidence to sit for the scheduled examination*" Other participants agreed with P5 and P2. Furthermore, P6 remarked, "*Subject specialists' (ES&C NQF L4 lecturers) are appointed as ES&C NQF L4 subject markers by DHET."* Furthermore, P1 added*, "The minimum pass marks for all core subjects is 50%"*. However, for dual-content, the ESASS also includes the integrated summative assessment (ISAT). "*Our resource funding is biased towards ISAT in order to ensure students meet the resulting requirements as dictated by DHET"*. Remarked P3. In addition to the above, P4 remarked, "*ISAT is set externally and the assessment is conducted by specialist instructor/assessor usually in September (third term).*" P6 added, "*Assessing of ISAT involves observation of students as they perform a task guided by the job instruction. Furthermore, using the rubric being guided by criteria and student performance competence level template."* P5 interjected in the discussion ". "*I take photos of students performing their ISAT activities to enhance evidence collection and keep evidence in my computer."* P1 remarked," *Students scores are recorded on the performance record template and final marks sent to DHET."* All participants concurred with P5, P6 and P1.

The findings of this study revealed that participants reflected on all three assessment types which are: assessment of learning (professional reflection), and addressing summative needs. Furthermore, the assessment as learning (societal reflection) which addresses the ISAT needs, and lastly the assessment for learning (critical /personal reflection) which addresses ICASS needs. Additionally, this study's findings revealed that for a dual-content subject like ES&C NQFL4, it is compulsory to have ICASS, ISAT and National examination marks in order for the students to get their full results. Moreover, the summative assessment is based on the written examination to verify if students meet the subject learning outcomes for grading and progression purposes whereas, the formative assessment monitors and supports teaching and learning to determine students' weaknesses and strengths. Furthermore, formative assessment provides feedback on progress and moreover, determines students' readiness for summative assessment. This study also revealed that formative assessment encourages engagement of lecturers with students thus making assessment part of teaching and learning. Moreover, Khoza (2015b), asserts that students involvement in collecting information as they are assessed, provides lecturers with the opportunity to know where to support students.

5.3.10.1 Who quality assures theory and practical?

TVET College quality assurance is two-folded, the internal done by the TVET College moderating team and external, done by DHET and Umalusi Quality Assurance team. Responding to the above questions (Who quality assures theory and practical?) P6 remarked, "*The college Quality Assurance unit is responsible for quality audit being guided by the college quality assurance policy. Campus visit and classroom observation as we teach theory and documents inspection forms part of the internal quality audit."* P5 added, *"Students PoE, (ES&C NQF L) attendance register and lecturers PoA are the documents the audit team commonly look for. When quality auditors finish, they sign the documents and then give overall feedback to the group being audited as well as recommendations of areas of improvements."* Other participants agreed with P5 and P6. P4 added, "*External quality audit is conducted by DHET and Umalusi Quality Assurance. DHET gives instruction for the college to send PoE and PoA to the selected TVET College where audit will take place. The post audit feedback is communicated officially by Umalusi Quality Assurance to respective colleges earmarked for quality audi*t." Other participants concurred with P4. However, for ISAT (practical) P1 remarked, "*Our workshop and the ES&C NQF L4 are not credited by the Sector of Education and Training Authority (SETA), and therefore, the SETA cannot quality assure yet Umalusi Quality Assurance has technical limitations to quality assure ISAT."* However, auditing theory

is limited to technical compliance to the quality policy but does not explore the lecturers subject-content mastery and pedagogy competences of lecturers. Moreover, TVET College does not have standards to bench mark practical competences across campuses offering ES&C NQF L4. Furthermore, individual lecturers set their own quality training standards.

5.3.10.2 How do you manage portability and credibility of skills acquired by students?

By definition, portability is designed to enable students to transfer credits of qualifications from one learning institution and/ employer to another (Revised AS Guidelines 2015). P5 made the following comments, "*The NCV qualification is not credit-based and thus cannot not even compare to the National Certificate: Occupation qualification of the same type which is accredited by the SETA when it comes to credibility."* P6 added, "*The Electrical Infrastructure Construction NQF L4 is a 130 credit but the ES&C NQF L4 (part of the qualification) is a 20 credit and the subject-content topics are not credit-based therefore making it difficult to be portable."* This view was echoed by other participants, and P1 added, "*Only the N4-N6 subjects are portable and acceptable by the Universities of Technology (UoT) not the NCV subjects hence the skills acquired by students from the ES&C NQF L4 subject cannot be technically portable."* To overcome the portability challenge, students may need to go through the recognition of prior learning process (RPL) and furthermore, the college will have to organise logbooks for students.

5.3.10.3 How credibility of skills acquired by students is managed?

By definition, credibility is to demonstrate national and international value and recognition of qualification and acquired competences and skills (Revised ES&C NQF L4 AG, 2015). P5 reflected, *"ES&C NQF L4 is a component of the Electrical Infrastructure elective subject registered in the national qualification framework (NQF) but the practical component is not registered with any authentic Education and Training Quality Assurance (ETQA) body,"* Other participants agreed with P5. In support of P5, P6 said, "*The ETQA forces the provider to be accredited which privileges the provider to be registered on the National Record Database."* In the same line of thinking, P4 remarked, *" When the provider is accredited, students being trained are also registered on the National Learner Record Database (NLRD). The NLRD provides the profile of the student and modules achieved."* Furthermore, TVET College assessors and moderators will have to be registered with the National Artisan Moderation Body (NAMB) and relevant ETQA for recognition by Quality Council of Occupations and Trades (QCTO), which is a recognised national quality council. Moreover, the accreditation of

workshops with the relevant sectoral education and training (SETA) may enhance the credibility of skills acquired by students. In addition, portability and credibility of students acquired skills is unlikely to be achieved in the absence of known competence standards benchmarked at Micro and Macro-levels. However, this study conducted at the two TVET College campuses reveals that there are no standards guiding training and skills acquired to manage portability and credibility which ultimately reduces the opportunities for employability by employer stakeholders.

In the South African context, TVET Colleges are the hopes for production of the middle level engineering skills to support the National Skills Development Strategy, the National Development Plan, New Growth Path and the alleviation of un-employment; reduction of inequality; crime and poverty.

5.4 Chapter conclusion statement

This chapter presented the reflections from ES&C NQF L4 lecturers. Furthermore, the chapter began with the Table (5.1) showing all themes, guided by the curricular spider-web known as learning signals (Van Akker, 2009; Khoza, 2015); levels of reflections (technical representing the professional rationale, practical representing the societal rationale and lastly the critical level representing the personal rationale). The findings were analysed and discussed following themes and categories per level.

This study finding reveals that goals were also a challenge because both the subject guidelines and the assessment guidelines focus only on the subject outcomes and learning outcomes excluding aims and broader objectives. Furthermore, findings exposed the challenges based on the lack of resources and time resulting on a gap between intended, enacted and the assessed/ achieved curricula. However, reflections by the participants revealed that ES&C NQF L4 curriculum is biased towards the competence/horizontal/integrated, outcome driven and opinion based curriculum as opposed to the performance/vertical curriculum based on school knowledge and international standards. Furthermore, this research revealed that participants lack the reflection knowledge which is seen as a critical component of successful teaching by several scholars (Adler, 1991; Akbari, 2007; Çimer. et al., 2013; Khoza, 2015b, 2015c; Khoza, 2018; Mezirow, 1990; Smyth. et al., 1999; van Manen, 1977a, 1995). The following chapter, will present the summary of each chapter, conclusions, and recommendatio

CHAPTER SIX

Summary and Recommendations

6.1 Introduction

The study purpose and design are meant to explore the lecturer's reflections of the teaching of ES&C NQF L4 NCV curriculum at TVET Colleges in KwaZulu-Natal (KZN) and, additionally, to understand lecturer's reflections. However, understanding lecturer's reflections, implies knowing the research objectives and questions and moreover, the study being able to answer the questions.

The objectives of the study are to:

- Explore the reflections of the lecturers who are teaching theory and practical in the Electrical Systems and Construction (ES&C) NQFL4 NCV programme at TVET College campuses in KZN

- Understand reasons that inform the lecturers' reflections of the teaching of Electrical Systems and Construction NQF L4 in the NCV curriculum at a TVET College campuses in KZN

- Explain the lessons that can be learnt from the lecturers' reflections of the teaching of the Electrical Systems and Construction NQF L4 in the NCV curriculum at a TVET College campuses in KZN

The above objectives will be achieved through addressing the following research questions that framed the study:

- What are the lecturers' reflections of the teaching of ES&C NQF4 NCV curriculum at TVET College campuses?
- What informs lecturers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses? (Why these reflections?)
- What lessons can be learned from the teachers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses

Chapter Five (previous chapter) presented, analysed and discussed the data generated. Therefore, this chapter will present the summary, major conclusions and recommendations derived from the data analysis and discussions.

In line with the latter statement, this chapter commences with a summary of each of the previous chapters, starting from Chapter One to Chapter Five. In addition, the main findings of the study will be discussed and thereafter, followed by suggestions for further research. The chapter also presents recommendations made by the study. However, findings from the lecturer's reflections were generated from the curricular spider-web ten concepts. Therefore, the recommendations likewise, will be done according to the findings from the ten curricular spider-web ten concepts (themes). This chapter will present Table 6.1 to indicate chapters, words, and percentages spread across chapters.

6.2 Summary of chapters

Table 6.1 indicating chapters, words used and percentage spread

CHAPTER	**WORDS USED**	**%**
Chapter One The overview, context and background	5305	8
Chapter Two Literature review Levels of lecturers' reflections Curriculum levels Socio-economic imperatives impacting on curriculum	14751	22
Chapter Three Curriculum concepts	16072	25
Chapter Four Study Architectural Plan and Technique	11716	18
Chapter Five Data analysis	17285	27
TOTAL	**65129**	**100**

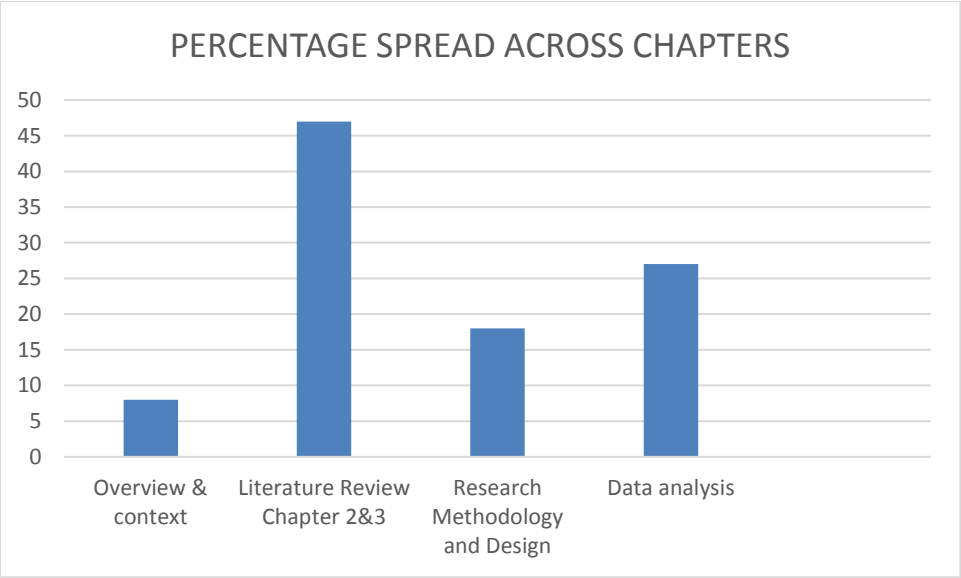

Figure 6.1 Words spread percentage across chapters

The Table 6.1 and Figure 6.1 reflects on the words used per chapter and furthermore, indicates the percentage per chapter. However, for this study, Chapters Two and Three are literature review, and therefore if combined, they contribute 47% of the study content followed by Chapter Five (data analysis) with 27%. Chapters Two and Three present the views of scholars on curriculum related issues as framed by the ten curricular spider-web concepts and furthermore, focus on the levels of reflections. By the same token, Chapter Five presents the voice of lecturers on their practices of implementing curriculum. Therefore, literature review and data analysis chapters will be compared in making the summary, conclusion, and recommendations of the study. Therefore, the next paragraph presents a summary of the chapters.

6.2.1 Chapter One: The overview, context and objectives

This chapter presented the context and general background of the proposed study and furthermore, outlined the title of the study, the: Lecturers' reflections on the teaching of ES&C NQF L4 NCV curriculum at TVET Colleges in KZ and the study focus. I presented the location of the study, the two were: campuses one situated in an affluent urban area at Umgungundlovu District, providing five EIC NQF L4 core subjects and the second campus situated in a semi-rural at Ugu District, providing two ES&C NQF L4 lecturers.

The study focus is teaching Electrical Systens and Construction NQF L4 NCV curriculum.

The rationale behind the chosen study was outlined, indicating my personal reasons for choosing the study. The rationale also presented what the literature outlines about the study phenomenon (lecturers' reflections) and study focus (teaching ES&C NQF L4). Study beneficieries were presented by this chapter. In addition, in Chapter One, I indicated the beneficiaries of undertaking this study to the TVET College fraternity. This chapter in particular looked at ten spider-web curricular concepts which has been presented by literature review.

Chapter One presented three research objectives which are as follow: (a) Explore the reflections of the lectures who are teaching theory and practical in the Electrical Systems and Construction (ES&C) NQFL4 NCV programme at TVET College campuses in KZN; (b) Understand reasons that inform the lecturers' reflections of the teaching of Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN; (c) Explain the lessons that can be learnted +from the lecturers' reflections of the teaching of the Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College campuses in KZN. Research questions were outlined as follow: (a) What are the lecturers' reflections of the teaching of ES&C NQF4 NCV curriculum at TVET College campuses? (b) What informs lecturers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses? (Why these reflections?) (c) What lessons can be learned from the teachers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses?

Furthermore, Chapter Four indicated the Study Architectural Pla and Techniquedesign by outlining the research archetype (interpretative paradigm), sampling being purposive and convenience, data generation tools namely: Reflective activity, one-on-one semi-structured interviews and the focus group discussions. Additionally, I outlined the data analysis, research limitations, research ethical issues and the trustworthiness highlighting the credibility, confirmability, transferability and dependability.

According to Table 6.1, Chapter One contributes 8% of information to the study. Therefore, the next chapter, the literature review (Chapter Two) presents the views of scholars.

6.2.2 Chapter Two: Literature Review (Scholarly narratives appraisal)

Literature reviewed explores the impact of academic work (body of knowledge) produced by National and International scholars on issues related to this study. This chapter linked literature to the research questions and objectives of the study, in order to answer research questions This study presents, a flowchart focusing on three areas namely, (1) literature reviewed related to

the of reflections levels which are technical; practical and critical. (2) Socio-economic imperatives impacting on curriculum. (3) Curriculum levels and other related issues; (4) Dominant ideologies affecting TVET Colleges education; (5) Curriculum models. This chapter further explored the lecturers' reflections guided by three levels: technical level, practical level and critical level of reflections (van Manen 1977; Maxwell 2013; Tailor 2004). The findings and discussions were guided by the categories which were organised according to the lecturers' reflection levels.

Chapter Two presented and explored the Socio-economic imperatives impacting on curriculum. This chapter explored the mandate of TVET Colleges in a developmental state, the broader socio-economic vision and impact on TVET Colleges from an education and training perspective. Furthermore, this chapter explored the importance of the alignment between the socio-economic vision and the college mandate.

This chapter has also defined the curriculum and presented the curriculum layers: namely the documented/official; the implemented/enactment and assessed/attained curriculum. In addition, this chapter presented the curriculum models applied in the implementation of curriculum. Moreover, the chapter presented dominant ideologies affecting TVET College curriculum.

6.2.3 Chapter Three: Conceptual Framework

Chapter Three reviewed the literature on the curricular spider-web concepts used to frame the study. The concepts are: rationale, goals (aims, objectives and outcomes), the accessibility, the content, lecturers' roles, teaching activities, learning resources, location, time, assessment and quality assurance (Van den Akker et al., 2009). The literature stressed the importance for all concepts to be given equal priorities with equal weight in order to achieve effective teaching and learning.

6.2.4 Chapter Four: Study Architectural Plan and Technique

Chapter Four focused on research design and methodology. The study adopted a qualitative design approach with a focus on interpretative paradigm. The study focuses on human knowledge in order to develop intervention strategies based on reasons and facts. Furthermore, this chapter presented the sampling: purposive and convenience, data generation using three methods namely the reflective activity, one-on-one semi-structured interviews and group discussions, and the data analysis using deductive and inductive reasoning of the guided

analysis. Moreover, Chapter Three presented ethical issues to be considered for this study, research limitations, and trustworthiness considerations namely: dependability, credibility, conformability and transferability.

6.2.5 Chapter Five: Research Findings and Discussions

Chapter Five presented, analysed and discussed the findings as revealed by lecturers' reflections of their teaching of ES&C NQF L4 NCV curriculum at TVET Colleges in KZN. Moreover, guided analysis was used following the ten curricular spider-web concepts, the learning signals.The concepts developed themes which formed categories that were linked to with the relevant level of reflections. Moreover, the categories were discussed in order to explore lecturers' reflections on the teaching of ES&C NQF L4 NCV curriculum with an intention for lecturers to improve their teaching practice.

6.3 Key Study Findings

Table 6.2, Comparison of Data analysis and Literature review, number of words used and % spread

WORDS AND PERCENTAGES FOR DATA ANALYSIS AND LITERATURE REVIEW				
DATA ANALYSIS			**LITERATURE REVIEWED**	
CONCEPTS	DATA ANALYSIS WORDS	%	LITERATURE REVIEWED WORDS	%
Rationale	2901	18	2123	14
Accessibility	1677	10	2229	14
Goals	1798	11	2095	13
Content	1510	9	1021	7
Teacher roles	1441	9	1559	10
Teaching activities	891	5	1483	9
Resources	1408	9	2023	13
Location	1185	7	505	3
Time	1085	7	1071	7
Assessment	2431	15	1582	10
TOTAL	**16327**	**100**	**15691**	**100**

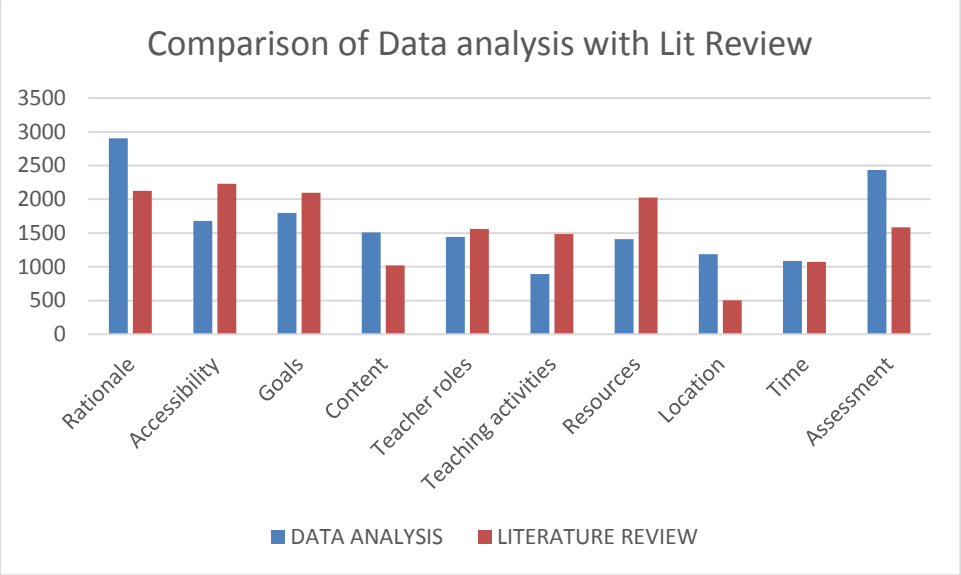

Figure 6.2 Comparison of data analysis and Literature review words spread across learning signals

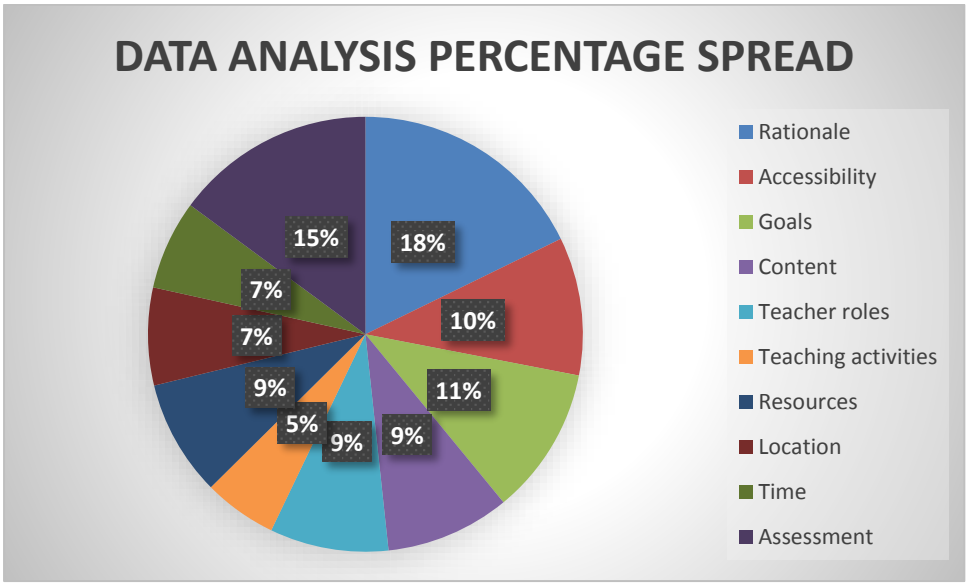

Figure 6.3 Data analysis percentage spread across learning signals

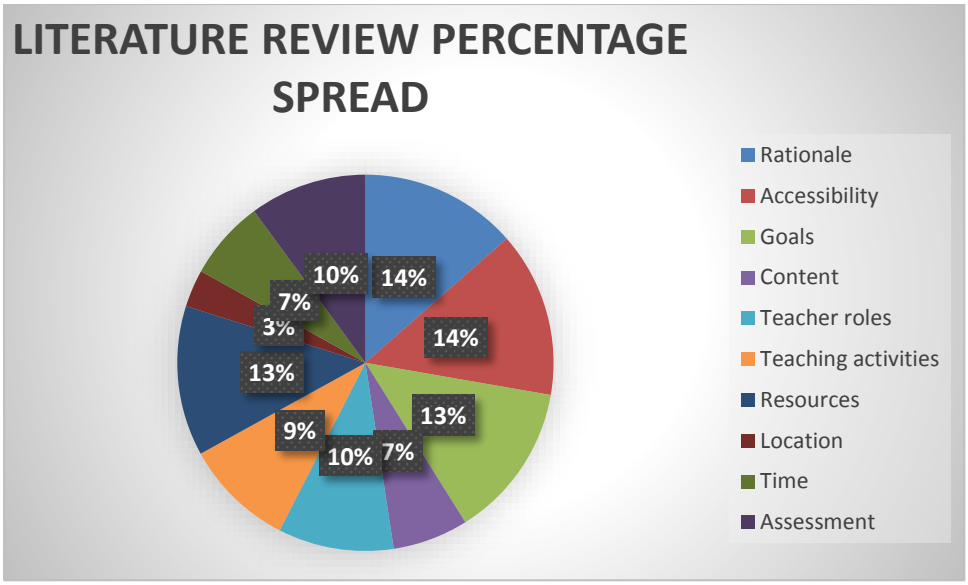

Figure 6.4 Literature Review words percentage spread across learning signals

For this study, data analysis and literature review were used to measure the contributions to the study, and these contributions were measured by words and percentage (%), thereafter, comparison was made. Table 6.2 presents the concepts, data analysis, literature review, number of words and % spread across each stream. The concepts or themes are based on curricular spider-web known as learning signals (Khoza, 2015c; Van den Akker et al., 2009). These themes also guide the lecturers' reflections of the teaching of ES&C NQF L4 NCV curriculum. Furthermore, Figure 6.2, indicates the comparison of the words spread between the data analysis and literature review. Learning signals were used as a measuring barometer. Figure 6.3, presents the percentage spread between learning signals themes of the data analysis. Likewise, Figure 6.4 also presents the percentage spread of words between learning signal concepts of the literature review. The number of words contributed by the data analysis (lecturers' reflections) is 16 327 compared to 15691 contributed by the literature review. The study findings revealed that the rationale which is the reason why lecturers teach ES&C NQF L4, is dominant in both the data analysis and literature review with 18% and 14% respectively. The voice of the participants dominated the literature review. The second highest number came from the data analysis assessments theme, contributing 15% to the study. The lecturers' voices were more dominant compared to the literature review. The accessibility is divided into physical access which is directed at students' accommodation and transport, to and from the College; Secondly financial access asks the question: Who funds the students to access the ES&C NQF L4 NCV curriculum? Thirdly cultural access which focuses on local cultural activities eg. religious, sports, language, social ethnicity diversity impacting on teaching and

learning. Accessibility is the third highest contributing concept with 14%, and literature review (voice of the academics) dominated the participants in terms of contribution to the study. Moreover, goals which is divided into: aims, objectives and outcomes contributed 13% of words towards this study. Literature review (the voice of the academics) dominated the participants. These findings affirm that, without goals, moreover, the outcomes, intended aims and objectives of the curriculum may not be achieved. This study finding revealed that the literature review contributed 13% in terms of words towards this study as opposed to 9% contribution derived from data analysis. The literature review covered all three components of resources namely: hard-ware; soft-ware and ideological-ware. By the same token, participants reflected mainly on hard-ware and soft-ware during group discussions omitting ideological-ware which is the heart of teaching. In addition, the study findings reveal that lecturers' roles contribution is almost balanced between data analysis and literature review with 10% literature review and 9% data analysis. A student-centred approach with the lecturer as a facilitator was dominant in the participants' reflections, followed by the lecturer-centred approach with the lecturer being an instructor and lastly the content-centred approach with the lecturers being an assessor.

The content theme was dominated by data analysis (participants voice) contributing 9% to this study while literature review contributed 7%. Participants reflected on the delivery of ES&C NQF L4 curriculum which is a dual-content covering theory modules and practical, skills modules. Furthermore, for time allocation theme, both the data analysis (voice of the participants) and the literature review contributed 7% each to this study.This study revealed that time allocation to the practical module was limited and favoured theory. Furthermore, Hoadley. and Jansen (2013) assert that time, physical resources and human resources are key ingredients for successful delivery of curriculum including the ES&C NQF L4. In addition, this study revealed that teaching activities were dominated by the literature review contributing 9% to this study compared to 5% contribution from the data analysis. This study revealed that the least contributing concept is learning location. The data analysis (voice of the participants) contributed 7% as opposed to 3% from the literature review. Quality and credible teaching and training is fundamentally dependable on the classroom conduciveness and the workshop accreditation status. The workshop should simulate the workplace settings and therefore, for trustworthiness by prospective employers, the workshop must be accredited by relevant SETA. Moreover, students must be registered on the Learner Database Records system of the SETA. This may help to track the practical profile of the student.

6.3.1 Rationale

Studies from the literature review, reveals that the rationale for teaching any subject may be based on personal rationale, societal rationale and professional rationale (Berkvens. et al., 2014). The personal rationale supersedes other rationales for the lecturers teaching ES&C NQF L4 NCV curriculum. Lecturers' personal rationale helps learners to receive the achieved curriculum and moreover, assists lecturers to theorise on any curriculum (Kehdinga, 2014). The why question addresses the individuals needs identity. Therefore, key attributes for personal rationale includes passion, determination, commitment and knowing own limitations and strength. However, findings from this study reveals that participants were motivated by their commitment to social transformation to prepare students for employment opportunities. In addition, employment may assist students to fight poverty, in-equality, crime and un-employment. Furthermore, TVET Colleges are a key component mandated to provide important support systems required by the Nation to support the economic growth strategy through providing human resources with relevant skills, values and competences (Adam et al., 2015; Akoojee., 2016; Ayonmike et al., 2015 ; Ezeani & Urama, 2014 ; Majumdar, 2013; Rasool. & Mahembe, 2014). Furthermore, the ES&C NQF L4 NCV curriculum is dominated by outcomes and moreover, is students-centred, and driven by horizontal approach and guided by every day knowledge (Bernstein, 1999; Hoadley. & Jansen, 2013). Therefore, social dynamics demand patriotism and commitment from the lecturers in order to achieve the mandate to develop students for the betterment of the country. For this study, societal rationale was revealed to be a dominant reason behind the lecturers teaching of ES&C NQF L4 curriculum. However, ES&C NQF L4 is a dual-content made of knowledge modules (theory based on professional dimension) and practical skill modules (based on societal dimension). In spite of ES&C NQF L4 being outcomes driven, the knowledge component demands professionalism from the lecturers. The study findings reveal that the recruitment of lecturers at TVET Colleges gives priority to lecturers with technical qualification (for example N-Diploma Electrical or National Diploma Heavy Current, as well as Trade-test over the University Degree). This study has revealed that most lecturers improve their academic qualifications after being employed as lecturers by the TVET College. Furthermore, this study has revealed that lecturers appreciate the value of academic knowledge.

In addition to the above, the ES&C NQF L4 subject guidelines is quiet on rationale and focuses on subject and learning outcomes. Therefore, for this study, professional rationale was not given privilege as it is based on scientific research which is based on performance curriculum

(Hoadley. & Jansen, 2013) and furthermore, does not promote every day knowledge and personal talents.The findings from this study indicated that there is a need for strong rationale to hold other concepts of the curricular spider-web together to enhance the teaching of ES&C NQF L4. However, the personal and societal nature of the participants' reflections answered the first research question which is: What are the lecturers' reflections of their teaching of ES&C NQF L4 curriculum? Lectures commitment to social transformation and passion to help students to attain competence status on their personal development, reflects strong inclination to societal rationale. This then addresses the second research question. Moreover, lessons to be learned include the need for DHET to establish the professional qualification designed to suit the TVET College lecturers in order to improve professionalism of the lecturers. Furthermore, the review process of ES&C NQF L4 subject guidelines should incorporate rationale of teaching ES&C NQF L4 NCV curriculum.

6.3.2 Goals

Scholars contend that goals towards which lecturers teach or facilitates should be informed by aims, objectives and learning outcomes (Donnelly & Fitzmaurice, 2005; Khoza, 2015b). The definitions and understanding of these goals subsequently becomes crucial at practice level.

The data analysis revealed that aims and objectives (which belongs to the lecturer) are not a priority for ES&C NQF L4 but the subject and learning outcomes are what lecturers focus on. The balanced goals formed by aims (critical reflection), objectives (technical/ professional reflections) and learning outcomes (practical/societal reflections) are part of the curricular spider concepts and therefore each component should be utilised effectively for proper curriculum enactment for the attainment of the intended outcomes. Moreover, Khoza. (2013b) maintains that the aims and objectives provided clear guidance at achieving the intended learning outcomes. However, this study revealed that for ES&C NQF L4, the subject guidelines focus mainly on subject and learning outcomes which put an emphasis on what a learner should know, understand, do and become, rather than what the lecturer anticipates achieving. Moreover, it is very quiet on aims and objectives.

Literature review and reflections from participants reveal that aims and objectives are captured in the SAQA ID 50441 official document, and lecturers do not have access to this document. Moreover, both the aims and objectives captured in SAQA ID 50441 are generic to all NCV programmes offered at NQF L4 and are not subject-content based. This suggests that management should discuss curricula official documents with lecturers and disclose the sources

to lecturers. Furthermore, policy review processes, should ensure that these aims and objectives are aligned to the subject in order to be relevant to lecturers for effective implementation and teaching practice at Micro-level. Moreover, this study revealed that practical skill modules for the dual-content ES&C NQF L4 NCV curriculum do not have a framework, and furthermore, lecturers are using ISAT as their structured practical tool. Additionally, curriculum goals (aims and objectives) are quiet on this matter and as a result students do not get quality training as they are being prepared for the world of work. The data analysis revealed that lecturers had difficulties in understanding goals especially during Phase One but improved during the group discussions. These findings imply that lecturers require training on goals (aims, objectives and learning outcomes) to improve their teaching practice and to align goals to the rationale.

6.3.3 Accessibility

Access theTVET College education means making it possible for more individuals to enrol regardless of their academic profile. Moreover, from a social justice perspective, access to education is the right of all individuals (Altbach et al., 2009; Berkvens. et al., 2014).

Accessibility is divided into physical access which is directed at students' accommodation and transport means to reach the College; secondly financial access asks the question: Who funds the students to access the ES&C NQF L4 NCV curriculum? Thirdly the cultural access which focuses on local cultural activities (eg. religious, sports, language, social ethnicity diversity) impact on teaching and learning.

The physical access focusses on student's accommodations and transport means from home/residential to the College campus. For the semi-rural campus, the data analysis revealed that the majority of students attending this College campus come from Kokstad, Durban, Umzimkhulu to name the few, resulting to them renting accommodations from the local landlords. Furthermore, this study revealed that rental accommodation closer to the College is scarce and therefore, students require transport from home and from the College, on daily basis. Two lecturers interviewed maintain that transport costs are R3000 and R2500 from their respective homes to the College monthly. The next question is who finances students and lecturers so they afford their expenses?

This study revealed that, unemployment, and poverty of parents for the disadvantaged students creates financial barriers to TVET College. The democratic Government has committed itself to assist eligible students through National Students Financial Scheme (NSFAS), to provide

equal access to good education based on equal rights to all students principle (DHET Senior Management, 2016; Papier, Needham, Nicola Branson, & Hofmeyr, 2015). The NSFAS is responsible for students funding of books, personal protective equipment (PPE), training resources, and educational excursion expenses. By the same token, parents or guardians are responsible for the payment of accommodation and transport prior to the arrival of the NSFAS grants. Furthermore, the data analysis revealed that NSFAS allocation may not be 100% across all levels but NQF L4 is allocated according to the subjects passed at the previous levels.

The reviewed literature, maintains that cultural access involves sports, religion, language, social ethnicity diversity, students' recruitment and learner entry diversity. The data analysis revealed that one of the chosen campuses is multi-racial dominated by Indians and Africans located in the urban area. Furthermore, this study revealed that cultural activities and sports are undertaken at this campus, and therefore, students focus on their studies as established by the curriculum plan and annual time-table. On the contrary, the other campus is situated in a semi-rural area and is dominated by African students and therefore, cultural and social ethnicity diversity has no impact on the learning and teaching of the ES&C NQF L4. However, different sport codes are conducted in September, commencing from intra-campus to inter-college, Provincial and National levels. Learning and teaching time is taken by sports however, sports are essential and promote health minds and body (Mbalula, 2011).

This study also revealed that cultural activities are not an issue since the majority of students are foreign to local developments. This implies that students catchment for these campuses is dependent on students that reside outside the campus locality, moreover, these students are not involved in local social activities. However, there is absenteeism of students resulting from their collecting of grants payment from South African Social Security Agency (SASSA) on monthly basis which negatively affects the effective learning. There is no absenteeism policy from the college to control absenteeism. The TVET College culture is about learning to practically apply knowledge. Moreover, in the learning process, the subject jargon, tools, and equipment names form a new technical language.

Data analysis further revealed that there is no Human Resource Development Officer responsible for lecturers' continuous development initiatives from the selected TVET College campuses. In addition, this study revealed that there is no plan and funding strategy to accommodate industrial excursions. Furthermore, the student recruitment strategy is based on the diverse academic qualifications of Grade 9-12. The participants further maintained that

students' diversity and accessibility to curriculum is not an issue to lecturers, but students coming from disadvantaged background especially Grade 9 and 10 drop out because subject-content is too complex, with Grade 11 and 12 copping. This study further revealed that the delays by NSFAS to effect study grants, which is a once off chunk usually in September, results in students' strikes and these strikes have a negative impact on the delivery and the attained curriculum.

6.3.4 Content

According to Berkvens. et al. (2014, p. 18) content is defined as "knowledge, skills, attitudes and values" and these culminates in learning activities that students experience in and outside school/college. By the same token, Hoadley. and Jansen (2013) assert that teaching begins with the lecturers understanding the subject topics they intends to teach. For this study, participants were expected to present their experiences guided by the following categories and reflection levels namely: topics (technical/professional reflection); practical scope and on-site project training (practical/societal reflection) and lastly the subject knowledge (critical/personal reflection). Moreover, for the dual-content subject which promotes integrated learning as ES&C NQF L4, the lecturers' knowledge of theory and topics sequence (technical level of reflection) is a point of departure. In addition, knowing how to integrate practical modules with theory (practical level of reflection) to teach students is essential. Furthermore, it is important for the lecturer to have pedagogical knowledge (Ideological-ware) on processes and practices of teaching and learning of the ES&C NQF L4 NCV curriculum (critical/personal level of reflection). Critical reflection empowers the lecturer to face different college socio-political dynamics which may hinder teaching and learning of students.

The data analysis of this study revealed that the TVET College recruitment system prioritises technical and practical competences of the recruited lecturer as opposed to professional qualification. The South African universities have no provision for qualifications tailor-made for TVET College lecturers resulting in a TVET College recruitment system relying on the University of a Technology (UoT) for Electrical Engineering Diploma (HC) and the National Diploma Electrical (N-6) qualifications. However, lecturers chosen for this study have technical (theory knowledge). Furthermore, they are competent artisans (practical knowledge) and have achieved their academic qualifications to meet the professional status requirements from SACE.

This study's finding revealed that the practical content scope for ES&C NQF L4 NCV curriculum is based on ISAT content, and this study has revealed that ISAT content is not enough to produce competences relevant for employability. In the same line of thinking and concern, Umalusi Quality Council Report (2012, p. 212) remarked that *"more practical work should be covered, to promote practical work linked to the subject topics covered in the curriculum, to enhance students understanding of complex concepts."* In addition, this study finding from the group discussions has revealed that there are no on-site or maintenance projects planned for students to practice team work, communication and enhance their problem-solving skills.

Regarding practical content scope, this study maintains that lecturers create practical content through identifying practical components from the outcomes provided by subject guidelines. However, there is no practical standardisation across campuses. In addition, there is no authentic body responsible for quality assurance, especially to quality check the practical component in order to create credibility, confidence and trust among potential employers. Reviewed literature avers that training without credible quality assurance compromises the final product (Cedefop, 2015; Cornford, 1997; Dai & Nguyen Quang Viet, 2012; Deißinger, 2011). At an exit point, students are not provided with practical profile reports that provides the list of all tasks completed including the ISAT and competence status in order to convince the employer stakeholder what the students know and can do. Reviewed literature stresses the importance of lecturers having content knowledge of the subject, pedagogical knowledge (IW), and the technological knowledge as a priority for the lecturers who teach ES&C NQF L4 (Koehler. & Mishra, 2009; Shulman, 1986). However, this study also revealed that there is no support available to the lecturers to handle complex topics and this is caused by the non-availability of subject matter specialists. There is a need for further research to establish the impact of the non-availability of a TVET College tailor-made lecturers' qualification. This qualification will assist in developing the ideological-ware skills which promotes awareness and critical thinking (Khoza, 2018).

Learning and teaching requires lecturers to know their roles especially when teaching a dual-content subject, namely the ES&C NQF L4 curriculum.

6.3.5 Lecturer roles

Reviewed literature reveals that the roles of the lecturers may be influenced by two major types of curricula approaches used in the delivery of the intended curriculum. These two types are:

Competence/integrated and performance or collection curriculum (Bernstein, 1999). Khoza (2016) avers that competence approach is more concerned about the outcomes and achievement of outcomes, and means to an end are not given priority. On the contrarily, the performance/vertical or collection is driven by identified content where students learn the same content from the lowest to the highest levels, furthermore, this approach is based on school knowledge and international standards for making decisions (Hoadley. & Jansen, 2013; Khoza, 2016). The performance curriculum is lecturer-centred driven with the lecturer dominating the learning space instructing students.

Studies reveal that there are three roles of a lecturer during the teaching and training processes and these are: being an instructor (lecturer-centred) based on technical/professional reflection; facilitator (student-centred) guided by practical reflection and lastly the assessor (content-centred) based on critical/personal reflection (Hoadley. & Jansen, 2013; Khoza, 2016; Khoza & Manik, 2015).

Over and above, during group discussions, participants revealed understanding of their different roles and the importance of the professional conduct and work ethics (Mchunu & Msibi, 2013; Veronesi & Varrella, 1999; Webb, 2009). Furthermore, this study revealed that the multi-purpose class design encourages the lecturer (facilitator) to move between students to support those who are struggling without slowing down the fast learners (Stiggins et al., 2007). In addition, this study findings also revealed that participants (lecturers) benefited from this project by understanding the significance of each lecturer-role in the teaching of ES&C NQF L4 NCV curriculum and the ability to acknowledge the importance of relevant approach when the need arises. This study also revealed challenges faced by students due to the lecturer selecting the student-centred approach as opposed to lecturer-centred approach. Participants acknowledged that this project has added value and insight on their understanding of the curriculum (lessons learnt from the project). In addition, this study revealed that the participants identified a need for all lecturers teaching ES&C NQF L4 curriculum to be exposed to the ten curricula spider-web concepts as part of lecturers development programme in order to create synergy between the intended, implemented and the assessed curriculum (proposal for further research and lecturer development). Moreover, the data analysis indicated that it was imperative for the lecturers to be conscious in the timing of the transition between student-centred (facilitator), the lecturer-centred (instructor) and the content-centred (assessor) approaches. Participants reflected at all levels discussing their academic and training roles, and

in addition, the study findings revealed that lecturers were in a better position to implement a particular role at their workshop and the classroom as when the need surfaced.

This study also revealed that lecturers were also involved at managing non-academic roles and these roles included: Consumables and equipment stack-taking, arranging and placing training requisitions with the Supply Chain Management, and attending campus meetings. Moreover, participants were concerned that these activities reduce time for academic activities and thus impact negatively on the curriculum delivery.

On the same line of thinking similar to lecturers roles, it is important to note activities used to teach and train ES&C NQF L4 curriculum

6.3.6 Teaching and learning activities

For this study, participants were expected to reflect on the following categories/propositions: the informal activities (formative) guided by practical/societal reflection; and the formal activities (summative) guided by technical/professional reflection. In addition, lecturers are supposed to reflect on ISAT which is a compulsory component to be completed and results submitted to DHET in order for the student to be issued the final examination results (resulted). ISAT is guided by the practical/communicative/societal reasons. In addition, these learning activities also include the supportive internal continuous assessment (ICASS) which is based on critical/personal reflection. The reviewed literature revealed that informal activities are administered by lecturers for non-grading purposes and on the contrary, formal activities are administered for grading purposes (Hoadley. & Jansen, 2013).

This study revealed that informal activities (formative) help students to understand their academic weaknesses. Moreover, pairing them on their sitting as they engage in activities, promotes learning community. Furthermore, this study further revealed that YuoTube activities referenced by the textbook author are left incomplete by students due to the lack of e-education and internet facilities.This study revealed that lecturers overlooked the importance of the linkage between informal activities which are used to develop and prepare students for formal assessment readiness and progress grading. In addition, formal tests and examinations namely the external summative assessment (ESASS), are written yearly for report and progression purposes. For the ES&C NQF L4 dual-content subject, students' practical competences and skills are assessed using the Integrated Summative Assessment (ISAT) model. This study revealed that training resources are only procured for ISAT because ISAT is a compulsory

component for student to attain the final examinations results. This tendency deprives students of the exposure to other important practical activities which would have enhanced the students' competences and readiness for employability. This implies that there is a shortage of resources to train students effectively for future employment. Furthermore, this study revealed that the lecturers focused on formal and informal activities omitting the internal continuous assessment activities (ICASS) as they reflected. The ICASS plan dictates that assessment activities must be spread throughout the three terms of the year. The critical activities for the ICASS includes: assignment, projects, tests (trial examination) and investigations. Additionally, the ICASS contributes 50% of the annual marks. The data analysis indicated that the informal and ICASS activities if used effectively, may help lecturers to comprehend students' academic behaviours, thus affording lecturers the opportunity to be able to decide which activities to use in order to improve the curriculum implementation and the attained results (Prinsloo & Slade, 2013). However, learning activities without corresponding resources, may results in poor quality students and a high failure rate.

6.3.7 Resources

The participants were expected to reflect on the three propositions, hard-ware; soft-ware and ideological-ware as guided by the corresponding reflection levels. This study indicates that participants reflected on hard-ware (HW) and soft-ware (SW) propositions and excluded ideological–ware (IW). Moreover, the literature revealed that HW and SW are tangible as opposed to the IW which is intangible and demands academic orientation (Khoza, 2015a, 2015c). On the same line of thinking, scholars (Criticos et al., 2005; Khoza, 2012, 2015a); agree that IW resources are what communicates teaching and learning. In addition, Khoza (2018) asserts that, IW resources includes ideas and theories involved in the use of HW and SW. Furthermore, IW involves educational theories acquired from their studies at the university.

Data findings at technical and practical levels of reflection indicate that, for the dual-content ES&C NQF L4, applied engineering technology in education and training (AETIE) resources are key components for skills transfer to happen effectively. Moreover, the AETIE is driven by technology of education (TOE) for effective learning and teaching. However, this study revealed that lecturers were not aware of IW during the first phase of the study. It was only after Phase Two group discussions that lecturers began to realise the importance of IW resources in the teaching of ES&C NQF L4 NCV curriculum. This implied that, teaching

methods play a critical role when it comes to resources deployment. This reflection from lecturers presents the answer for question three which is: What are the lessons learned from the study? Furthermore, on the question of how facilities cope with learners to lecturer ratio, participants revealed that there are more learners than training facilities, equipment's, and tools resulting in learning activities being compromised.

This study also revealed that the selected TVET College campuses do not provide educational ICT resources for lecturers and students. Furthermore, this study revealed that material procurement turn-around time and the cutting of items regardless of their importance, affected the teaching and assessed curriculum. These reflections based on data analysis from the lecturers' answer question: What are the lecturers' reflections of the teaching of ES&C NQF L4 NCV Curriculum at a TVET College? Moreover, studies conducted by (Dasmani., 2011; HRDCSA TTT Report, 2014; MTT Final Report, 2013), revealed that for TVET Colleges, resources, are a key challenge to ensuring the synergy between the planned, implemented, and attained curricula. The findings of this study revealed that participants used resources without acknowledging the resource categories and furthermore, HW and SW are more dominant in their reflections. This reflection, answers the third question: What lessons can we learn from this study? In addition, for effective teaching and training, teaching should take place in a conducive and acceptable environment.

6.3.8 Learning location

Participants were expected to elaborate on their workshop accreditation status and thereafter present their perspectives based on the three propositions, the classroom (technical reflection), workshop (practical reflection) and the computer laboratory (critical reflection).

On the issue of workshop accreditation, all participants revealed that their workshops were not accredited. Furthermore, the reflections of lecturers on topics covered in the ES&C NQF L4 revealed that equipment like medium voltage transformers, switch gear (Ring main unit) and renewable technologies were abstract and therefore requiring teaching models however equipment are expensive and therefore digital models could be a solution. The findings revealed that computer laboratories were solely designed to access students and subjects that require computer related examination at the end the year. No space for either lecturers and students' further development except after school hours and weekends.

The data findings from the participants suggest that lecturers use multi-purpose classrooms instead of workshops, for delivering both the content and practical work. Therefore, the knowledge and practical, skill modules require relevant and conducive space approved for such operations. The participants' reflection revealed that accreditation of workshop infrastructure facilities promotes standardisation of workshops across different College campuses and employer confidence. Vocational based students learn best through seeing and touching rather than using hearing sensors alone (Gayeski., 1993; Gilakjani, 2012; Khoza, 2013; Mayer, 2001). Therefore, reflections from the participants encouraged the need for workshops to be accredited. Having classrooms, workshops and computer laboratories as resources is not enough in the absence of time.

6.3.9 Time Allocation

This study's findings revealed that time distribution across all seven subjects which are four core, and three fundamentals, is the same regardless of the credit bearing and weight it adds to a one-hundred and thirty credit programme. For example, Life Orientation is a ten credit subject but gets the same time allocation like a twenty credit subjects. Furthermore, non-practical subjects like English and Mathematics also get the same share of time allocation. Additionally, the time distribution seems to focus at serving lecturers equal time loading to meet HR policy requirements rather than solving subject time shortage. Moreover, for the ES&C NQF L4 NCV curriculum, time is spread across classroom activities (hours), workshop activities (years) and computer laboratories (days). Therefore, time needs more attention and possible a policy review for effective delivery of the ES&C NQF L4.

The data analysis findings revealed that there is no consistency in time distribution between the two campuses researched. Time allocation for these campuses is two-hours twenty minutes and four-hours twenty minutes respectively per week. The study revealed that participants who are allocated two-hours twenty minutes use Fridays and Saturdays without extra payments to compensate the shortage of time. Moreover, findings revealed that time allocation and training resources are a major obstacle in the delivery of the intended, practiced and attained curriculum at Micro-level. Moreover, practicals are done only once a week to allow a smooth flow of groups. The quality of time spent is not enough to develop competences, skills and values to meet prospective employer expectations to test whether implemented/enacted curriculum is able to meet the expectations of students and employment stakeholders. The evaluation of the

enacted and attained curriculum can not be achieved without assessment. Therefore, the following paragraphs will focus on assessment.

6.3.10 Assessment and Quality Assurance

The assessed or attained curriculum which is the third layer of the curriculum, determines whether there is a synergy between the intended and the enacted curricula (Hoadley. & Jansen, 2013; Van den Akker et al., 2009). Furthermore, the ES&C NQF L4 NCV curriculum is a competence/horizontal curriculum based on the CBET model. This curriculum seeks to develop knowledge, skills, values and attitudes of students in order for students to articulate to the HEI and further, increase employment opportunities (DoE Minister Pandor, 2006). Three assessment methods were adopted for this study. The assessment of learning, assessment as learning, and the assessment for learning. The assessment of learning includes summative assessment which involves testing how much content the student knows in order to progress to the next grade (Khoza, 2015c). The assessment as learning involves peer assessment and self-monitoring or being own assessor guided by active learning to create own learning and assess fellow class-mates (Khoza, 2015b). The assessment for learning support teaching and learning and promote further learning and students feedback (formative method) (Kennedy. et al., 2006; Khoza, 2016).

This study findings revealed that participants reflected on all three assessment types which are: assessment of learning (professional reflection), addressing summative needs; the assessment as learning (societal reflection) which addresses the ISAT needs, and lastly assessment for learning (critical /personal reflection) which addresses ICASS needs for example trial examination, projects, assignments, and investigation. Additionally, this study findings revealed that for dual-content subjects (for example ES&C NQFL4), ICASS, ISAT and National examination (ESASS) marks, are compulsory for the students to get their full end of the year results. Moreover, ICASS marks makes 50% of the final marks. In addition, the summative assessment is based on the written examination/tests to verify if students meet the subject learning outcomes for grading and progression purposes. On the contrary, the formative assessment monitors and supports teaching and learning to determine students' weaknesses and strengths, and provides feedback on progress and furthermore determine students' readiness for summative assessment. This study also revealed that formative assessment encourages engagement of lecturers with students thus making the assessment part of teaching and learning.

Data analysis of this study revealed that there are no standards guiding training and skills acquired to manage portability and credibility. The lack of credibility and possibility reduces the opportunities for employability by prospective employer stakeholders. Furthermore, students certificate indicates the seven academic Electrical Infrastructure Construction (EIC) NQF L4 subjects. The practical component is not captured on the certificate. Moreover, there is no logbook which details practical work done at the College workshops. In addition, the study further revealed that workshops are not accredited by the relevant Energy and Construction SETA. The lack of accreditation of workshops jeopardise employment opportunities of students and furthermore, accreditation may enhance the credibility of skills acquired by students. This paragraph answers the third research question: What lessons can be learned from the lecturers' reflections of the teaching of ES&C NQF L4 NCV curriculum at TVET College campuses?

6.4 Suggestions for further research

- Research must be done to explore the impact of resources and time allocation on the attainment of the intended curriculum on the teaching of ES&C NQF 2-4 NCV curriculum and furthermore, explore how these impact on students' employment.
- Research needs to be extended with other TVET Colleges to explore their application of the curricula spider-web/learning signals to improve quality of learning and teaching practice for better attained curriculum.
- Research to explore the importance of lecturers' reflections and critical thinking in the implementation of ES&C NQF L4 curriculum.
- Research on practical content besides the ISAT content and further explore the standardisation of practical content across campuses of the TVET College. Furthermore, explore the impact of accreditation of workshops on the credibility and portability of the practical modules achieved by students studying EIC NQF L4 programme.
- A study on return-on-investment (ROI) and sustainability of students, considering the implications to the NSFAS funding, drop-out rate, throughput rate and students exit to Higher Educational Institutions.
- A study to explore the impact of diverse students enrolment on the certification and programme completion rate.

6.5 Recommendations

6.5.1 First recommendation on Rationale

TVET Colleges are mandated by the South African Government to meaningfully prepare students for participation in the socio-economic community. This study revealed that lecturers were not aware of the importance of the rationale from a curricula spider-web point of view let alone that rationale were divided into personal, societal and professional. During group discussions, it became evident that lecturers were motivated mainly by personal and societal reasons to teach ES&C NQF L4 NCV curriculum. However, lecturers chosen for this study realised the importance of the professional reasons and thereafter shared the academic benefits. The subject guidelines and the SAQA ID 50441 documents do not have these rationales. Therefore, a structured development plan to assists lecturers at TVET Colleges to understand that rational is the core of the intended, implemented and the attained curriculum is recommended. Moreover, there is a need to include rationale when curriculum documents for ES&C NQF L4 are reviewed.

6.5.2 Second recommendation on Goals

The revised subject guidelines which is an intended curriculum document, only contains subject and learning outcomes (Which guides students what they should do and achieve). The aims and objectives (meant to guide the lecturers) are not included in the document. The subject guidelines should include broader goals based on the mandate of lecturers as perceived by the Government and society. The subject guidelines document must be reviewed to include broader goals, aims and objectives. Alternatively, the management must organise workshops for the empowerment of lecturers on goals, aims and objectives for the ES&C NQF L4 NCV curriculum.

6.5.3 Third recommendation on Accessibility

The reviewed literature revealed that accessibility is classified into physical access; financial access and lastly cultural access. For this study, participants revealed that physical accessibility involves students' accommodation and transport to and from their respective residential places to the College. On accommodation, the delays of the arrival of NSFAS grants results in students not meeting the rental obligation with the landlords, leading at them being evicted. This results in low student-retention, absenteeism, and students strikes. DHET should speed up the payment of NSFAS and furthermore, extend the current students village used by university students to

include TVET College students. Furthermore, TVET College student may also have access to bus transport. The study findings also revealed that students' recruitment requirements at entry level is Grade 9;10;11 and 12. This results in a mixed capability class dominated by lower grades of Grade 9 and 10 who drop out when the subject-content becomes complex. The suggested solution is that the recruitment should be a balance of lower grades and higher grades with an emphasis on students' capabilities for the sustainability of the classes and progression. Furthermore, the TVET College in collaboration with DHET must review the recruitment policy in order to improve the throughput.

6.5.4 Fourth Recommendation on Content

Deficiency of scholastic content (IW) knowledge is a challenge to most TVET College lecturers as revealed by this study. The ideological-ware knowledge involves teaching methods, educational philosophy and the ability to interface HW and SW in the teaching practice of ES&C NQF L4 curriculum. Furthermore, this study revealed that the subject guides provided by DHET, is quiet on the practical content scope to teach ES&C NQF L4 NCV curriculum, and consequently lecturers use the ISAT content as a practical scope. The study further revealed that the TVET College practical funding is limited to ISAT activities.

The recommendations regarding practical modules scope among other things is to explore the value of ISAT using the eyes of Industry captains. Industry employs students depending on the quality of skills and competence they have. On contrary, TVET College management and DHET put emphases of ISAT marks as a requirement for students to be resulted in the final examinations. The reflections of the participants indicated that the ISAT scope is not inclusive of the entire ES&C NQF topis. Therefor there is an omission of some important areas derseving to be included in the training and practical scope. Moreover, practical training funding is limited to ISAT resources preparation and implementations. The study also revealed that ISAT is valid for three years, implying that students remain stagnant for three years without changing the practical content. Therefore, discussions between the relevant College personnel and industry to explore the practical content scope which is aligned to industry needs of industry is essential. The outcomes of the discussions may also enhance employment opportunities for students. For the pedagogical content knowledge, the TVET College must arrange lecturers development workshops. At a Macro-level, DHET must fast track the development and implementation of TVET College tailored-lecturers' qualification.

6.5.5 Fifth recommendations on the role of lecturers

Lecturer roles are guided by curriculum implementation and assessment. This study revealed that lecturers don't understand the three layers of curriculum and approaches to curriculum delivery namely performance, lecturer-centred guided by school knowledge, and universal canons followed by competence, student-centred guided by everyday knowledge (Bernstein, 1999). The revised subject guidelines for ES&C NQF L4 (official document) is quiet on the lecturers' roles. Therefore, I recommend that the TVET College management should support lecturers through its lecturer continuous development programme. Furthermore, subject guidelines review should include lecturer roles teaching practical and theory.

6.5.6 Sixth recommendations on resources (HW and SW)

Literature revealed that resources are key to implementation of the assessed curriculum. This study revealed that for the ES&C NQF L4 curriculum which is dual-content and engineering oriented, the applied engineering technology in education (AETIE) resources namely equipment, consumables, tools and machinery are a challenge. Furthermore, the study revealed that the procurement system through Supply Chain Management is not sensitive to turn-around time for lecturers to receive the procured materials. Moreover, literature has revealed that there is over theorising caused by the shortage of training resources (Ayonmike et al., 2015 ; Dasmani., 2011; HRDCSA TTT Report, 2014; MTT Final Report, 2013). As part of an intervention to solve the material procurement challenge, discussion meetings should be encouraged between the lecturers and the procurement section to check if the correct materials and quantities represent what was ordered. The procurement section must promptly report any uncertainty to the lecturers to avoid delays of the material arrival. Moreover, the College management must be sensitive to the budget for material ordering and have an intervention plan to prevent further challenges.

6.5.7 Seventh recommendation on learning location and time

This study findings revealed that learning location is based on multi-purpose classrooms which are equipped with teaching and learning models suitable for the teaching of knowledge modules. The research finding revealed that students do not have stand-alone computer laboratories for students. Furthermore, internet facilities are not provided for both students and lecturers due to connectivity challenges. Lecturers use their modem and purchase data to access the internet. On the same line of thinking, (Khoza, 2015c) posits that internet resources can

connect a person to all corners of the world and bring education to students living venues. The study also revealed that workshops are not accredited and therefore the practical modules offered lacks credibility and portability. Moreover, this study identified challenges at the computer laboratories and workshops. As part of the solutions, the TVET College management should negotiate with credible network service provider to buy internet data and access to WI-FI for students to access internet until the internet connectivity is established. Additionally, training workshops accreditation process must be done so that the practical modules offered by the TVET College are portable and credible. Moreover, all practical modules done should be captured on students' logbooks and signed by the assessors. The study finding also indicated that time distribution across the seven subjects was equal regardless of the subject credit value and dual-content status. The assessment guidelines and the subject guidelines (official documents) do not indicate time allocated for practical training. Moreover, lecturers use Friday (after-hours) and Saturdays to teach practical without any remuneration to the concerned lecturers. Suggested solutions: Time allocated to the subject must be based on subject credit value. Furthermore, lecturers who scarifies their time to ensure students are properly developed needs to be compensated for their extra effort.

6.5.8 Eighth Recommendation on Assessment

Data analysis and reviewed literature have revealed that key assessment methods used are External summative assessment (ESASS), conducted at the end of the year to determine student progression. Furthermore, the Integrated summative assessment (ISAT), a practical assessment which is compulsory to all students to have for resulting. This study revealed that Internal Continuous Assessment (ICASS) is important as it carries 50% of the final marks. Students may not receive their examination results in the absence of the ICASS marks. Moreover, ICASS tools includes theory tests, assignment, projects, trial examination and investigations. ISAT and ICASS marks are moderated internally guided by the TVET College moderation policy, and externally by DHET and Umalusi Quality Assurance. However, the external moderation team should include SETA quality assurer for the practical moderation to be credible. This study further revealed that formative assessment is also conducted not for grading purposes but as a support system in preparing students for summative assessment.

6.6 Study limitations

ES&C NQF L4 NCV dual-content requires specialists lecturers and these lecturers proved to be a scarce commodity for this study. Consequently, I used lecturers from two TVET College campuses to off-set this challenge.The campuses chosen for this study were 230km apart and furthermore, lecturers were busy with ISAT preparations. The movement between these campuses to access participants became a costly exercise. Moreover, like all other qualitative research, this study is small scaled and thus its findings and results are subjective, personal and contextual and therefore cannot be generalised. Thus, the findings of this study can be used only for the sake of transferability rather than generalisation

6.7 Conclusion

The study purpose was to understand the lecturers' reflections, explain what informs the reflections and furthermore explain the lessons that can be learnt from their reflections on the teaching of ES&C NQF L4 NCV curriculum at a TVET College in KZN. The study was guided by research objectives and the following research questions.

- What are the lecturers' reflections of the teaching of ES&C NQF4 NCV curriculum at TVET College campuses?
- What informs lecturers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses? (Why these reflections?)
- What lessons can be learned from the teachers' reflections of the teaching of NQFL4 ES&C curriculum at the TVET College campuses?

Answers to the 1st question

The reflection of the lecturers is mainly influenced by their understanding and interpretation of the curricula spider-web ten concepts. Thus their reflections according to literature review, can be technical, practical or critical (Taylor, 2004; van Manen, 1977a). Furthermore, personal, societal and professional rationale may influence the lecturers' reflections (Berkvens. et al., 2014).

Answers to the 2nd question

The lecturers teaching background is influenced by professional knowledge, and societal knowledge resulting in lecturers reflecting at technical, practical or critical levels.

3rd Question (lessons learnt)

Lecturers are willing to learn new ideas and knowledge for example the ten curricular spider-web concepts, reflection levels. Lecturers are also willing to share their experiences when properly approached. Participants' reflections may also inform the policy review processes.

For this chapter, a summary of the study is provided and the findings from the reviewed literature and data analysis were compared. Moreover, recommendations deduced from the learning signals concepts (Khoza, 2015c) have been made. All concepts are important but they revolve around the rationale concept during the teaching process. In addition, studies revealed that curriculum beyond the three layers can be vertical or horizontal to determine teaching methodologies and professional knowledge required to drive the curriculum (Hoadley. & Jansen, 2013; Khoza, 2015b). However, participants' reflections reflected that lecturers used all teaching methods namely the content-centred (assessor); the student-centred (facilitator) and lastly the lecturer-centred (instructor) approaches to implement and assess the intended curriculum.

Candidate's observation and remarks on TVET Colleges as key component of education system in South Africa the developmental state.

My rationale for conducting this study is motivated by passion for our TVET Colleges and the desire to see them be effective and productive. Furthermore, as part of society, we all have pinned our hopes on TVET Colleges for the eradication of poverty, the high rate of youth un-employment and in-equality. Therefore, transforming technical education from the Apartheid system to Democratic system required knowledge and a legal framework. Hence, the following policies and legislation documents were used to support the implementation of Government programmes and projects:

- FET Act No 16 of 2006 and amendment 2012;
- The National Education Policy Act No 27 of 1996;
- Skills Development Act of 98;
- SAQA Act;
- National Skills Development Strategy (1), (2), (3) and (4);
- National Certificate: Vocational Policy 2006:
- White Paper on Post-School;
- New Growth Path;
- National Skills Accord and the National Development Plan.

The major shift and evolution started between 1998 -2002 when 152 technical colleges in South Africa were merged to produce 50 FET Colleges with 264 campuses leading to the establishment of New Institutional Landscape for Public Further Education and Training Colleges. This resulted in the second order changes responsible for the fundamental modification within organisation of the then FET and now TVET College system. Simultaneously, curriculum change which is the first order changes aimed to improve efficiency and effectiveness, became a critical component of transformation.

Despite multitude of challenges associated with organisational change, there are major milestones achieved worth to be celebration since the transition from the Apartheid system to the Democratic system. These include the capacity to develop policies and legislation that has been put in place since 1994. Secondly, the development of diverse programmes namely the National Certificate: Vocational (meant for vertical articulation to HE institutions) and the National Certificate: Occupational (for artisanal development). Thirdly the migration from the

Provincial Department and College Council as employers to DHET as an employer thus shifting from being a Provincial competence to a National competence has been a huge milestone.

Some challenges of note are that TVET Colleges do not have capacity to conduct in- house research and furthermore, College lecturers donot have publishing capacity. These are critical components for any learning organisation with a growth desire. I have observed academic development at the Universities of Technology. As much as they were also affected by the merger processes, they are now offering post-graduate qualifications. Restructuring did not detour their desire to grow academically. TVET Colleges are positioned to provide middle-level skills and therefore are expected to display excellence in the provisioning of technical skills offered. Being a member of the DHET family, TVET Colleges will have to fight to better their status professionally and provide state-of –the- art innovative programmes to attract industries and the community. Furthermore, the economy down turn might have a negative impact on the TVET College funding and therefore improving partnerships with industries may boost the college coffers.

The knowledge and experience I have gained as a participant in the migration of the TVET Colleges, as well as knowledge gained through this study have provided me with new lenses and a desire to further contribute to the body of knowledge. I am grateful to the Almighty for offering me this opportunity to do this study and wish to have power and energy to contribute in the full transformation of TVET College system.

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APPENDIX/ANNEXTURES

115 Bhambatha Street
BB 744 Umlazi
4031
27 October 2016

ATTENTION: Deputy Principal Academic Services
Umgungundlovu TVET College
44 Burger Street
Pietermaritzburg
3201

The Honourable Deputy Principal

Application for Permission to Conduct Research at your college campus

My name is Cornelius Nzimande. I am a candidate studying for Masters of Education on Curriculum Studies at the University of KwaZulu-Natal, Edgewood campus, Pinetown, South Africa. I am interested in exploring lecturers' reflections on the teaching of Electrical Systems and Construction NQF L4 NCV curriculum at a TVET College. I have observed that lecturers are not aware of issues between documented curriculums (intended) and enacted (practiced) curriculum which yield in different results (attained curriculum) in TVET Colleges. I am conducting a case study in order to understand the lecturers' reflections of the teaching of the Electrical Systems and Construction NQF L4 NCV curriculum. I am hopeful that the outcomes of the study will add value to the participants understanding of the link between intended curriculum (as positioned by NCV Policy 2006), the practiced curriculum and the attained curriculum which ultimately may improve the intended outcomes.

I therefore, kindly request you to grant me permission to access six lecturers from your college who are currently teaching or have taught Electrical Systems and Construction NQF L4 NCV curriculum. This research is important for me in order to meet the qualification requirement. I will appreciate to access lecturers preferable with 2years and above of teaching experience on the mentioned elective subject. The research project will be conducted at your college campus, and I will observe and respect the value of teaching time to your students and therefore commit not to create disturbances of the learning activities.

Please note the following:

- The college and lecturers' confidentiality is guaranteed.
- The interview, reflective activity and focus group discussion may last for about 1 hour each.
- Any information given by your lecturers cannot be used against the college, and the collected data will be used for purposes of this research only.
- There will be no limit on any benefit that the college and lecturers may receive as part of participation in this research project;
- Data will be stored in secure storage and destroyed after 5 years.
- Lecturers have a choice to participate, not participate or stop participating in the research. The college and lecturers will not be penalized for taking such an action.
- The college and lecturers are free to withdraw from the research at any time without any negative or undesirable consequences;
- Real names of the college campus and lecturers will not be used, but symbols such as A, B, C, D, E and F will be used to represent college and lecturers' names.
- The college and lecturers involvement is purely for academic purposes only, and there are no financial benefits involved.

I can be contacted at:
Email:corneliusnzimande54@gmail.com
Cell: 0734316014 or 0635883154

My supervisor is Dr. SB Khoza who is located at the School of Education, Edgewood campus of the University of KwaZulu-Natal.

Contact details: email: khozas@ukzn.ac.za Phone number: 031 2607595.

Discipline Co-ordinator is Dr. LR Maharajh,

Curriculum Studies, School of Education,

Edgewood campus, University of KwaZulu-Natal

Phone: 031 260 2470

Cell: 082 202 2524

Email: maharajhlr@ykzn.ac.za

You may also contact the Research Office through:

Ximba Phumelele

HSSREC Research office,

Tell:031 260 3387

Email: ximbap@ukzn.ac.za

Thank you for your contribution to this research

DECLARATION

I, D.D. Msomi - Umgungundlovu (Full names of the TVET College Deputy Principal) hereby confirm that I understand the contents of this document and the nature of the research, and I consent for the college and lecturers to participate in the research project.

I understand that the college and lecturers are at liberty to withdraw from their participation from the research at anytime, should they so desire.

..... Date 28/11/2016

Signature of Deputy Principal

COLLEGE STAMP

UMGUNGUNDLOVU TVET COLLEGE
CENTRAL OFFICE, 44 BURGER STREET
PRIVATE BAG X9060, PIETERMARITZBURG 3200
TEL. 033 341 2100 FAX: 033 345 9827
EMAIL. marketing@ufete.co.za

115 Bhambatha Street
BB 744 Umlazi
4031
22 August 2017

Dear Mr Luthando Msindwana
INFORMED CONSENT LETTER

My name is Cornelius Nzimande. I am a candidate studying for Masters of Education on Curriculum Studies at the University of KwaZulu-Natal, Edgewood campus, Pinetown, South Africa. I am interested in exploring lecturers' reflections on the teaching of Electrical Systems and Construction (ES&C) NQF L4 NCV curriculum at a TVET College. I have observed that lecturers are not aware of issues between documented curriculums (intended) and enacted (practiced) curriculum which yield in different results (attained curriculum) in TVET Colleges. I am conducting a case study in order to understand the lecturers' reflections of the teaching of the Electrical Systems and Construction NQF L4 NCV curriculum. I am hopeful that the outcomes of the study will add value to the participants understanding of the link between intended curriculum (as positioned by NCV Policy 2006), the practiced curriculum and the attained curriculum which ultimately may improve the intended outcomes.
For me to complete this study I need to generate data from the lecturers. It is in this context that I kindly request you to participate in answering questions based on your experiences on the teaching of Electrical Systems and Construction NQF L4 NCV curriculum.

Please note the following:

- The college and your confidentiality are guaranteed.
- The interview, reflective activity and focus group discussion may last for about 1 hour each.
- Any information given by you cannot be used against you, and the collected data will be used for purposes of this research only.
- There will be no limit on any benefit that you as a lecturer may receive as part of participation in this research project;
- 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. The college and lecturers will not be penalized for taking such an action.
- You are free to withdraw from the research at any time without any negative or undesirable consequences;
- Your real identity and the college campus name will not be used, but symbols such as A, B, C, D, E and F will be used or pseudo names.
- Your involvement is purely for academic purposes only, and there are no financial benefits involved.

- If you are willing to be interviewed, please indicate (by ticking as applicable) whether or not you are willing to allow the interview to be recorded by the following equipment:

-

EQUIPMENT	LECTURERS RESPONSE	
	Willing	Not willing
Audio equipment		
Photographic equipment		
Video equipment		

I can be contacted at:
Email:corneliusnzimande54@gmail.com
Cell: 0635883154

My supervisor is Dr. SB Khoza who is located at the School of Education, Edgewood campus of the University of KwaZulu-Natal.
Contact details: email: khozas@ukzn.ac.za Phone number: 031 2607595.

Discipline Co-ordinator is Dr. LR Maharajh,
Curriculum Studies, School of Education,
Edgewood campus, University of KwaZulu-Natal
Phone: 031 260 2470
Cell: 082 202 2524
Email: maharajhlr@ykzn.ac.za
You may also contact the Research Office through:
Ximba Phumelele
HSSREC Research office,
Tell:031 260 3387
Email: ximbap@ukzn.ac.za
Thank you for your contribution to this study.

PARTICIPANT DECLARATION

LUTHANDO MSINDWANA .... (Full names of participant) hereby confirm that I understand the consent of this document and nature of the research, and I am willing to participate in this research study.

I understand that I can withdraw at any time I feel uncomfortable.

[signature] 14/09/2017

Signature of the Participant Date

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

14 September 2017

Mr Cornelius H Nzimande 216075837
School of Education
Edgewood Campus

Dear Mr Nzimande

Protocol reference number: HSS/2120/016M
Project title: **Lecturers' reflections on the Teaching of Electrical Systems and Construction National Certificate vocational level 4 at a TVET College in Durban.**

Expedited Approval

In response to your application dated 08 December 2017, 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)

/px

cc Supervisor: Dr Simon R Khoza
cc Academic Leader Research:
cc School Administrator: Ms T Khumalo and Ms P Ncayiyana

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001 Durban 4000
Telephone: +27 (0) 31 260 3587/3350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
Website: www.ukzn.ac.za

Reflective Activity Guiding Tool for Participants –Open Ended Questionnaire

Table 4.2 (Reflective activity guiding tool)

	This Reflective Activity is for reflections of your teaching of ES&C NQF L4 NCV curriculum. You may use various sources to complete this activity. Present your reflections by following the curricular learning signals (based on curriculum concepts) questions presented below.	
CURRICULUM CONCEPTS	**QUESTIONS DIRECTED TO LECTURERS**	**Problem: Lack of link between curriculum levels- intended; practiced and achieved**
		Reflect on the practiced curriculum of the teaching of ES&C NQF L4 and consider NCV Policy 2006 purpose (p 83 (1)(3) Use the space below to reflect your experience in curriculum practice.
Rationale	Why are you teaching (Rationale/visions) ES&C NQF L4 NCV curriculum? **Respond on:** • Personal reasons • Professional reasons • Societal reasons	
Accessibility	How do students access the learning of ES&C NQF L4 NCV curriculum? **Respond on**: • Physically; • Financially • Culturally.	
Goals	Towards which goals are you teaching ES&C NQF L4 curriculum? **Respond on:** • Aims, • Objectives, • Outcomes	
Content	What content are you teaching in ES&C NQF L4 curriculum? What is the practical training guide content of your training of ES&C NQF L4 NCV curriculum? **Respond on:** • Topics • Practical modules/Projects • Practical guide content • Subject knowledge	
Teacher role	How do you perceive your role as an ES&C NQF L4 lecturer? **Respond on**: • Teacher-centred (instructor) • Learner-centred(facilitator) • Content-centred approach(assessor)	
Teaching activities	Which activities are you using to teach and train ES&C NQF L4 curriculum? **Respond on:** • Informal assessment task • Formal assessment task • Formal learning activities • Practical module training	

	• Supporting tasks	
Learning Resources	What resources are you using to teach ES&C NQF L4 curriculum? How do learning facilities cope with learner: trainer: facilities ratios and what impact it has on product quality? **Respond on:** • Hard-ware • Soft-ware • Ideological-ware	
Learning Location & Time	Where and when are you teaching ES&C NQF L4 and what is your training workshop accreditation status? **Respond on:** **Location** • Workshop • Classroom • Computer laboratories **Time** Hours and Days	
Assessment and Quality Assurance	How are you assessing learners in ES&C NQF L4 NCV curriculum and who quality assures theory and practical? **Respond on:** • Formative assessment • Summative assessment • Continuous assessment (CASS) • Integrated summative assessment • External summative assessment (ESASS) How do you manage portability and credibility of skills acquired by learners?	

Christine Davis

5A Denys Reitz Roosevelt Park

Tel: 0716850170

Email: christinem4c@gmail.com

Cornelius Hlangene Nzimande

115 Bhambatha Street

Lot BB 744 Umlazi 4031

06 December 2018

To whom it may concern

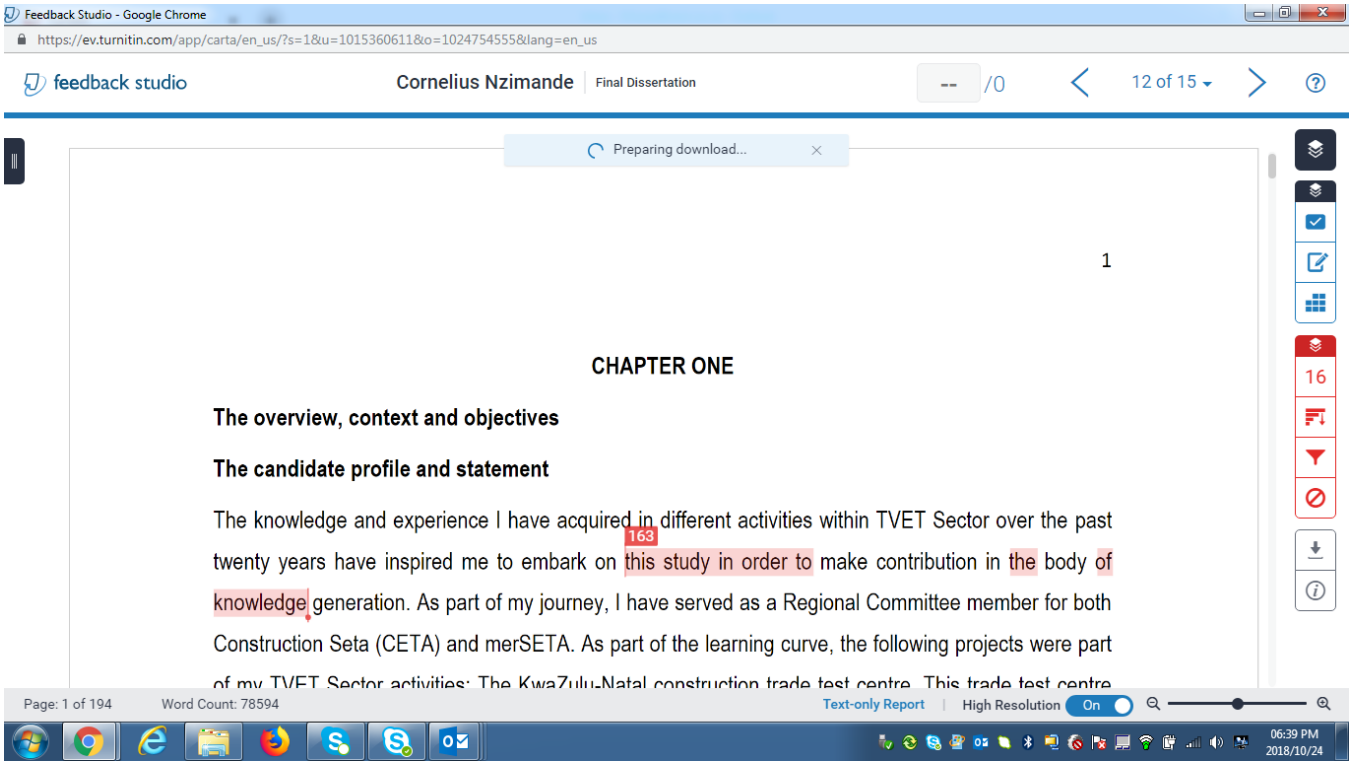
Re: Thesis: Lecturers' reflections of the teaching of Electrical Systems and Constructions NQF L4 NCV curriculum at TVET College campuses in Kwa-Zulu Natal.

This letter serves to confirm that I edited Cornelius Nzimande's paper before submission.

No content was added and very little was changed by me during the process. Changes were limited to spelling and grammar, while content changes were identified and submitted to Mr. Nzimande for review.

Please feel free to contact me should you have any further questions.

Christine Davis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Cornelius Nzimande
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Preparing download...
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CHAPTER ONE
The overview, context and objectives
The candidate profile and statement
The knowledge and experience I have acquired in different activities within TVET Sector over the past twenty years have inspired me to embark on this study in order to make contribution in the body of knowledge generation. As part of my journey, I have served as a Regional Committee member for both Construction Seta (CETA) and merSETA. As part of the learning curve, the following projects were part
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