



AN ANALYSIS OF TVET NQF LEVEL 4 LEARNERSHIP CURRICULUM IN RELATION TO WORKPLACE REQUIREMENTS

A research report submitted by Lynn Wykes Fortuin



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DECLARATION

I hereby declare that the content of this research is authentic and builds on objective and investigative analysis of the data obtained from the relevant sources. Arguments and positions established within this document are based on the analyses informed by this research. All sources consulted have been listed in the reference list at the end of this report.

Signed:.....

Date:.....

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LIST OF ABBREVIATIONS

ANC	African National Congress
COSATU	Congress of South Africa Trade Union
CWP	Community Works Programmes
DHET	Department of Higher Education and Training
DOE	Department of Education
EPWP	Expanded Public Works Programme
FET	Further Education and Training
GETC	General Education and Training Certificate
HET	Higher Education and Training
HRDC	Human Resource Development Council
ICT	Information and Communication Technologies
JIPSA	Joint Initiative of Priority Skills Acquisition
Merseta	Manufacturing, Engineering and Related Services Sector Education and Training
NASCA	National Senior Certificate for Adults
NQF	National Certificate Vocation
NSC	National Senior Certificate
NEET	Not in employment, education or training
NQF	National Qualifications Framework
NSF	National Skills Fund
OBE	Outcomes Based Education
OQSF	Occupational Qualifications Sub-Framework
QCTO	Quality Council for Trades and Occupations
RPL	Recognition of prior learning
SAIVET	South African Institute for Vocational Education and Training
SAQA	South African Qualifications Authority
SETA	Sector Education and Training Authority
TVET	Technical Vocational Education and Training
WCED	Western Cape Education Department

WIL	Work integrated learning
WBE	Work based experience

CHAPTER 1

BACKGROUND AND RESEARCH OVERVIEW

1.1 Introduction

Colonialism and the apartheid system have had a great impact on our present day education system. According to Unwin, McGrath, Badroodien, & Kraak (2004), South Africa is attempting to position itself as an economic player on the world stage, whilst continuing to shake off the destructive legacy of colonialism and apartheid. The high unemployment levels coupled with a vast informal economy, necessitates the quest for innovative ways to help individuals develop the skills and knowledge required to enter the labour market in parallel with economic development required to expand employment.

In 1994, the newly elected African National Congress (ANC) government inherited a bleak post school education sector together with a wide range of other related educational challenges arising from past inequalities (Department of Higher Education and Training, 2012). Despite more than 20 years into the new democracy, the education system, including post-school education, still faces various challenges despite various advances and gains made since 1994. The White Paper for Post-School Education and Training claims that the education system continues to replicate the divisions of the past, and the institutional landscape is still reminiscent of apartheid because institutions are still disadvantaged in terms of infrastructure, teaching facilities and staffing (Department of Higher Education and Training, 2013).

In South Africa the post-school education system comprises of all education and training provision for those who have completed school, those who did not complete their schooling, and those who never attended school. It consists of the institutions presented below in a Table, which fall under the ambit of the Department of Higher Education and Training:

#	Type of institution
1.	26 public universities
2.	50 public technical and vocational education and training (TVET) colleges (formerly known as further education and training [FET] colleges)
3.	public adult learning centres (currently absorbed into the new community colleges)
4.	private post-school institutions (registered private FET colleges and private higher education institutions, also to be renamed TVET colleges)
5.	the SETAs and the National Skills Fund (NSF)
6.	regulatory bodies responsible for qualifications and quality assurance in the post-school system – the South African Qualifications Authority (SAQA) and the Quality Councils.

Table 1: Post school education system (Department of Higher Education and Training, 2013)

In addition, a number of state-owned post-school institutions exist under the authority of several other national government departments, mainly (but not exclusively) training public service workers (Department of Higher Education and Training, 2013).

The different post schooling sectors were introduced by the post-apartheid government to address educational access, including new curricula and new modalities of teaching and learning. Against this backdrop, South Africa began prioritising education and training with three broad social goals: redress of past injustice, developing skills for an industrialising economy and enhancing democratic practices (Volker, 2013).

There are basically two, among other challenges, faced by post-school education. Firstly, the large number of young citizens who are not employed, and not in education or training (NEET), and secondly, the lack of sufficiently skilled professionals, managers and artisans (approximately 432 100), which reflects an uneven quality of education (Joint Initiative on priority Skills Acquisition (JIPSA, 2010). According to

Mbatha, Wildschut, Mncwango, Ngazimbi, & Twalo (2014), artisanal occupations are experiencing a crisis in South Africa and artisan skills development is recognised as an urgent priority to achieve greater economic and social development, within the context of widespread and growing levels of youth unemployment. The ability of our technical and vocational education and training system to produce the required quantity and quality of artisans is highlighted.

This study focuses on post school education, particularly the Technical Education and Training (TVET) sector, which is seen by government as a vehicle to transform the economic and social woes facing South Africa. The study acknowledges that the challenges are not unique to South Africa and take cognisance of efforts being made in other countries who have invested greatly in the TVET sector, with the hope of improving the economy and contributing positively to skills development. To highlight an example, the Nigerian government similarly established a number of TVET - oriented institutions with the intention of launching the country steadily on the path of technological progress and national development in furtherance of its commitment to TVET (Besmart-Digbori, 2011 as cited by Akhuemonkhan & Raimi, 2013). Despite the continued efforts made by the Nigerian government on the TVET system, the pace of technological progress, employment and industrialisation is still slow and unimpressive as evidenced by the rising unemployment rate and high level of poverty in the country. The proverbial saying, “Do not put all your eggs in one basket”, is perhaps apt in this example and from a South African perspective we can avoid making the same mistake by acknowledging and striving to correct all aspects within the system which impact on its ability to successfully contribute to the skills and economic crisis; the curriculum for purposes of this research, being a crucial aspect.

1.2 The Further Education and Training Certificate - NQF Level 4 Learnership

The TVET learnership programme, with special emphasis on the NQF Level 4 Welding Learnership Curriculum is of special interest to this study and its relevance in meeting the needs of the workplace. The learnership system was established by the Skills Development Act, Act No. 97 of 1998 (effectively in place since 2000), in order to address the skills crisis post-democracy 1994. This system proposes a dual vocational-training model which encompasses theoretical learning at a college or training institution with practical on-the-job-training in the workplace. The programme culminates in a recognised national occupational qualification which is defined by SAQA as a minimum of 120 credits, translating roughly to a 12-month provision period (Labour.gov.za, 2018).

Kraak and Young (2001) view the implementation of learnerships necessary to promote meaningful learning that is relevant to the needs of the ever-changing and dynamic world of work. Since learnerships are demand-led where structured workplace experience forms an integral part of the programme, partnerships between TVET colleges and stakeholders, particularly industry, is essential to make TVET colleges responsive to the needs of stakeholders (Human Resource Development Council for South Africa (HRDC), 2014). The White Paper for Post School Education and Training (2014) equally concur that the design of training systems, including curricula, requires close cooperation between education and training providers and employers – especially in those programmes providing vocational training. With this in mind, Gamble (2004) reminds us that colleges are widely criticised for their alleged weak responsiveness to the needs and realities of the labour market. It is well-documented that many college graduates in South Africa complete their programmes of study without having had access to practical on-the-job training deemed vital for occupational preparation (Kraak & Hall 1999; DoE 2001 as cited in Gamble (2004).

Work-based learning has therefore become not only desirable but also an essential core element of TVET college provision. The Department of Higher Education and Training (2013) state that it is an axiom of TVET institutions that providing workplace experience

for college students and their instructors has a strong positive effect on the students pass-rates and prospects for employment. It also helps to bring the classroom curriculum into closer alignment with the skills needs of industry, and generally promotes long-term cooperation between the college and the company.

Gamble (2004) as cited in Allais (2012) cautions that in order to improve vocational education, a strong focus on education is needed instead of putative employer needs. Whilst there may be merit in this view, it is important to acknowledge that curricula cannot be designed without considering and including workplace needs as part of the curricula.

This study is based on the assumption that releasing college graduates into the workplace without contemplating from the onset the needs of the employer, results in unproductive artisans. Allais (2012) however argues that a qualification seeking only to mimic a traditional, restricted and shrinking area of labour market activity will inevitably have low market currency, and become quickly out of tune with changes in the labour market. It is my view that the education needs Allais is advocating includes building strong institutions which will make TVET's institutions of choice; capable of responding effectively to the skills shortage; providing curricula which matches the needs of the workplace whilst simultaneously equipping learners to be productive in any work setting; and finally, ensuring that lecturers possess the sagacity to deliver the curriculum not only as a means to an end, but as an end in itself (vehicle for workplace skills).

1.3 Problem Statement

TVET colleges are under pressure by Government to expand enrolments, increase their offerings and improve the quality of education offered. Projected head-count enrollments of 2.5 million at TVET colleges by 2030 to assist in alleviating the high unemployment rate and critical skills shortage prevalent in South Africa are cited by the DHET (Department of Higher Education and Training, 2013).

There is also the expectation that vocational education and training produce artisans who are productive in the work place. This expectation raises questions about the knowledge and skills required of an artisan in the workplace in relation to the NQF Learnership Level 4 curriculum. Meeting Governments targets calls for the strengthening of partnerships between colleges and workplaces, placing colleges in a viable position to meet the requirements of the workplace. According to the Department of Higher Education (2012) however, the public college sector is small and weak, unable to deliver the skills required by the economy.

Prospective learnership candidates have to be contracted to an employer in order to embark on the training programme (Labour.gov.za, 2018). Learnerships are therefore a medium to generate employment, while simultaneously developing a skilled workforce in response to labour-market needs. Albeit that since the inception of learnerships, it features in the top 10 learning interventions of the most recent South African training industry report, the system has not met expectations, particularly in terms of employer participation (Meyer & Bushney, 2007, p. 37 as cited in Mummmenthey, C., & du Preez, R. (2010). Overall optimism has been reported by stakeholders who are accountable for the success of learnerships, while media reports and independent researchers have been critical of their success, citing high drop out rates and blaming poor recruitment techniques and poor support mechanisms as some of the main reasons for learnership failure (Letsoala, 2007:1 & Butcher, 2007:1).

The NQF Level 4 Welding curriculum falls under the ambit of the Manufacturing - Engineering and Related Services (Merseta). Research presented by the National Skills Research Agency (NASRA), suggests that within this SETA, although learnerships are increasing access and contributing to the development of skills at all levels, there is a perception of lack of preparedness in critical skill areas. In some of the sectors studied, the skills imparted are outdated and not keeping up with the technological cutting edge (Davies and Farquharson, 2004). The research further raises concerns about the mismatch between the skills and capabilities developed during training and those required in the workplace. The report further, claims that industry involvement in

determining the technological content of the curriculum and setting standard as insufficient, and there are not sufficiently skilled subject experts to develop material (Davies and Farquharson, 2004).

Kraak (2014) attributes these shortcomings to government's lack of consultation with the private sector which should be instrumental in creating jobs for graduates of TVET colleges. In addition, many lecturers are ill-equipped to handle the new NQF curricula; many have had no practical teaching component and their skills are out of touch with developments in industry. The sentiment that TVET colleges possess limited capacity to respond effectively to the needs of the labour market is echoed by many commentators (McGrath, 2003; Akoojee, Gewer & McGrath, 2005; McGrath & Akoojee, 2009).

This research is intent on analysing the NQF Level 4 Learnership curriculum (Welding) in preparing the learners for productivity in the workplace. It is my assumption that if the curriculum is not closely aligned with the needs of the workplace, the learner will not be productive from the onset of employment. It is envisaged that the findings of this research will provide guidelines in terms of the design and development of the curriculum, in particular, the setting of objectives; (in line with the expectations of the workplace) and the desired learning outcomes (a competent graduate able to function efficiently in the workplace) and synergy between the two phenomena (curriculum and the workplace).

1.4 Aims of the study

This research aims to:

- Analyse the NQF Level 4 Learnership curriculum contents in relation to workplace requirements
- Identify possible gaps between the NQF Level Learnership 4 curriculum and workplace expectations

1.5 Research Questions

Main question

To what extent, if at all, does the NQF Level 4 Learnership curriculum meet the needs of the workplace?

Sub questions:

- a) What knowledge and skills does the NQF Level 4 Learnership curriculum seek to develop?
- b) To what extent does the knowledge and skills within the NQF Level 4 Learnership curriculum meet with workplace requirements?
- c) What is the nature of gaps that exists between the NQF Level 4 Learnership curriculum and workplace requirements?

1.6 Rationale of the study

Government's ambitious expectations of the TVET colleges to increase enrollments to assist in alleviating the skills shortage, justify research to critically explore and interrogate the capacity of TVET institutions to carry out this mandate. The TVET sector currently has a negative image with regards to its current mix of programmes and qualifications, which the White Paper on Post-School Education and Training alludes to as being too complex to administer, difficult for learners to understand, and often poorly quality assured (Department of Higher Education and Training, 2013). It is because of the above mentioned information that the study was conceived, to gain insight on the nature of TVET curriculum to alleviate skills shortage.

In addition, personal experience with the NQF Level 4 learnership programme necessitated the need to critically explore the relationship between the curriculum and workplace expectations. Coming from a teaching background, I understand the fulfillment of teaching relevant subjects such as Life Skills which we anticipate will help equip learners to lead effective, productive lives in our somewhat challenging fast-paced society. On the other hand, I have also been involved in education and training projects which I deem to have failed some learners due to the lack of synergy between the training programme and the anticipated outcomes of this programme. By way of illustration, a NQF Level 4 welding Learnership, conducted by Merseta as an attempt to alleviate the huge unemployment and high substance abuse scourge facing the youth in Eldorado Park, compelled me to question the relevance and ability of the curriculum to equip the learners with the necessary skills and knowledge required in the workplace. Upon placement of these learners at various workplaces; it became evident that there were serious gaps between theoretical and practical training acquired during training and the workplace expectations. Papier (2014) claims that prospective employers often complain that the education system does not give individuals the necessary skills to be productive in the workplace, or to start their own enterprises concurs with my assertion.

My interest therefore in this study, is to determine whether there are possible gaps between the curriculum and workplace requirements and expectations. It is my view that

if any gaps exist and they are successfully closed, it will greatly enhance the learners' chances of securing and maintaining productive workplace employment on the one hand and on the other; flooding the labour market with a competent labour force.

1.7 Significance of study

It is envisioned that this study may highlight the importance of aligning the NQF Level 4 curriculum with workplace requirements, so that graduate artisans will be productive in the workplace from the onset of employment. The study may provide insights into gaps which may exist between the NQF Level 4 curriculum and workplace requirements. This may inform the South African Institute of Vocational Education and Training (SAIVET) in terms of designing and developing relevant and innovative curricula for TVET and community colleges. This might lead to the implementation of quality programmes implemented at TVET colleges that will make them institutions of choice for employers.

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction

This chapter synthesises existing body of knowledge on TVET curricula in relation to workplace requirements that has been produced and written by researchers and scholars (Fink, 2005). Thus the discussion will critically engage with selected research pertaining to NQF Level 4 curricula presented at TVET colleges and community colleges, and the effectiveness thereof in meeting workplace requirements.

A report by JIPSA (2010) describes the South African economy prior to 1994 as one of the poorest examples worldwide of the interaction between the institutions of human capital and their final users. The education and training environment was characterised as being passive and lacking dynamism as evidenced by the duplication of facilities, significant resource discrepancies among the different racial entities, as well as discrepancies between programme offerings and the demands of industry (Mc Grath & Akoojee, 2009). Both university and TVT institutions are described by Hofmeyer & Nyoka (2014) as being weak, as the former operated in a vacuum and often offering programmes that bore little relation to the needs of a developing economy. According to Akoojee (2008), the college sector was also characterised by discrepancies between programme offerings and the demands of industry (McGrath 2004, Badroodien and Kallaway 2003 as cited in Akoojee, 2008). In addition to the TVT institutions functioning ineffectively; employers showed little interest in developing their employees (Joint Initiative on Priority Skills Acquisition, 2010). The institutional and structural arrangements between education and skills development, the labour market, the production system and other social and economic institutions do not always facilitate appropriate, responsive and up-to-date development of skills and capabilities HSRC (Human Sciences Research Council) (2012). The productivity of the learner in the workplace is therefore questionable.

From a South African perspective, the Ministry of Higher Education, has made efforts to address the skills gap and encourage unemployed youth to attend technical vocational colleges, as evidenced in the White Paper of Education for Post-School Education and Training (Department of Higher Education and Training, 2013). The process of attracting more learners into the vocational sector, equipping them with relevant, valid skills and knowledge whilst simultaneously addressing the skills gap, requires a deliberate examination of the curriculum. The type of knowledge as well as the structure of the curriculum (NQF Level 4 engineering qualification) becomes a relevant research issue, because of the expectation that the learner has to enter the workplace as a fully functional employee whilst stimulating economic development for our country.

Given that the curriculum in this study is under scrutiny, it is important to state that there are three key role-players involved within this construct, namely, curriculum developers, lecturers and workplace employers. This research has taken cognisance of the perceptions of these role players in order to arrive at reliable findings during this research study.

2.2 TVET Colleges in South Africa and internationally

The role of TVET is to respond to technological advancement, globalisation, knowledge economy, changes in modes of production in the work place, growing economic openness and competitiveness (Rufia, Kamin, & Idris, 2013). Mouzakitis (2010) asserts that the advent of globalisation has demanded more specialised labour markets, higher levels of skills, and diversified vocational education. From an educational policy perspective, The Human Resource Development Council (HRDC 1994) states that the TVET discourse in South Africa has been borne out of a distinctive set of major policies legislated by the post-apartheid government. These includes: Green Paper Post School Education and Training (2012), National Development Plan (2012), New Growth Path (2011), Human Resource Development Strategy for South Africa 2010 - 2013 (2009) and Industrial Policy Action Plan 2 (2011), and will all be discussed briefly due to space limitation.

According to Rasool (2014), a disjuncture exists between the Green Paper for Post-School Education and Training (2012) and the other policy documents listed above, and claims that it has a narrower focus than the other policies. This paper cautions against the TVET colleges becoming ‘all things to all possible learners’. The document defines vocational education as ‘middle level of education which provides knowledge and skills to enter the economy, as well as ongoing professional development and training in the workplace’. This supposes a TVET system firmly located in the human capital, economism and productivism paradigm, which McGrath (2012) views as grounding TVET in an outdated model of development”. Conversely, the vision of the National Development Plan (2012), the New Growth Path (2011), the Industrial Policy Action Plan 2 (2011) and the Human Resource Development Strategy for South Africa 2010-2030 (2009) are, in Rasool’s opinion, much broader. The need for the TVET sector to be broadened to include national social and economic goals such as economic growth and development, poverty reduction, employment creation, unequal income distribution, sustainable livelihoods, youth development, innovation and industrial advancement is therefore articulated.

From an international perspective, the TVET sector differs across countries in terms of its nature, size and mission. Countries with well-functioning TVET systems and similar middle-income countries as South Africa; who have located their TVET system within a developmental state are: India, Korea, Singapore, and Malaysia (TVET Colleges Technical Task Team, 2014).

India’s TVET system is geared towards creating employment opportunities and imparting suitable skills for self-employment, particularly in the rural and unorganised sectors. Two of the major challenges within the Indian TVET system include a strong mismatch between demand and supply, and a mismatch between labour market needs and vocational courses. Lessons to be learned from India’s response to the challenges are initiatives aimed at encouraging private partnerships which focus on making the system more responsive to the needs of the labour market, the upgrading of training institutions into centres of excellence and skills development initiative scheme (Rasool & Mahembe, 2014).

The success of the Korean TVET system is credited to a thorough curriculum, strong school – industry cooperation including: internships, industry-based training for faculty members, education for mid-career industry employees, joint college/industry research programmes, information exchange, the active work of industry/college cooperation committees, and curriculum development at the industries' request (Rasool & Mahembe, 2014). As a result, college graduates are highly valued with the employment rate estimated at 18% to 21.5%, higher than that of four-year University graduates (Korean Council for College Education, 2005:41 as cited in Rasool & Mahembe, 2014).

Singapore's TVET system is described as a 'world-class model' The system has evolved over the years from secondary school based vocational education to post-secondary fully fledged top-line educational colleges, and from serving the needs of the factor driven economy to current status of serving the needs of a globalised and diversified economy (Rasool & Mahembe, 2014). The success of the Singapore system has been anchored in how to transform the TVET system to the various phases of economic development. Consequently, the economy was restructured and moved from labour intensive to capital intensive, and then to knowledge intensive, and the TVET system responded to ensure that the workforce had the relevant knowledge, skills, and values (Rasool & Mahembe, 2014)

Another country which strongly illustrates the merits of locating the TVET sector within a developmental state is the Malaysian system. The role of the TVET sector was broadened over the years to the current purpose of 'supporting the country's economic development (Leong, 2011: 7 as cited in Rasool & Mahembe, 2014). For the Malaysian country, TVET is considered to play a pivotal role in providing the skilled workforce required for the country's economic transformation, from a middle income into a high income and developed economy by 2020.

The above discussed countries provide support for the notion of locating the South African TVET system within a developmental state. They also illustrate that though the TVET systems were built around the notion of industrialisation, economic development or productivism, the purposes and structure of the TVET systems have been reformed

in line with the phases of economic development. Based on the Asian experience (Korea, Singapore, and Taiwan), it can be concluded that the basis for success with vocational education is that each stage of development requires a TVET approach that prepares the country for the next stage of its development. The curriculum therefore would be aimed at addressing the needs of the learners, industry, and community or society.

2.3. Curriculum concept in TVET sector

Different concepts of “Curriculum” abound in the educational arena. Maluleka (2015), for example, states that the perception of many ordinary South Africans, some teachers included, is that a *curriculum* is a document drafted by ‘curriculum experts’ appointed by the government, which teachers, learners and other relevant stakeholders ought to follow and to a large extent not question. Shay (2012), states that the “Curriculum” *seems* to be considered greatly as what teachers are going to teach and what learners are going to learn, but actually the term is also closely related to how well the learners learn, the outcomes, and includes many issues. These issues include the teaching curriculum; the learning curriculum; the testing curriculum, the administrative curriculum and the hidden curriculum (Shay, 2012). It is also acknowledged that the term ‘curriculum’ is a broad concept and includes aspects such as standards setting, learning programme development and delivery and quality assurance of the delivery process (South African Qualifications Framework, (SAQA) (2000).

For Moll, Steinberg, & Broekmann (2005), the curriculum is often viewed in two parts; the curriculum as a *plan* and the curriculum in *practice*. As a plan, it relates to the ‘official curriculum (government policy), that is, the “prescribed curriculum” (standards set by a provincial educational authority), the “formal curriculum” (what the TVET college has decided should be taught), the “curriculum framework” (national educational principles), and the “classroom curriculum” (textbooks, lesson plans, and so on). The curriculum as a *practice* means examining what happens in reality, meaning how the curriculum plan is implemented by lecturers and experienced by students (SAQA 2010). This latter view of the concept ‘curriculum’ is of relevance for this study, because it is

concerned with an analysis of how the curriculum works in practice, and what happens in the process of it changing from a plan into a reality. In this instance, the exposure the learners have to both theoretical and practical knowledge is of interest (Moll, I., Steinberg, C. Broekman, I., Gewer, A., Bialobrzaska, ., & Allais, S. (2005).

Kelly (2004) posits that few would argue that within a democratic society, an educational curriculum at all levels should be concerned with providing a liberating experience. The curriculum should therefore focus on things such as the promotion of freedom and independence of thought, social and political empowerment, respect for the freedom of others, acceptance for the variety of opinions, and the enrichment of life for every individual in that society, regardless of class, race or creed (Kelly, 2004). This view of the curriculum, albeit noble in its attempts to put the learners needs squarely in the middle of the curriculum debate, falls short on addressing the link between the curriculum and the needs of the end user, the workplace requirements in this instance.

Allais's (2012) definition most aptly describes the term 'curriculum' in the context of this research. I therefore draw on this definition and propose that the NQF Level 4 curriculum must equip learners for meaningful employment with the intention of meeting the needs of the workplace, while simultaneously providing learners with knowledge that increases their power and fulfilment in the workplace and in society. This power and fulfilment can be ascribed to the learner developing high levels of autonomy, understanding the work process and the wider industry, and the integration of manual and intellectual tasks. The implication then is that the curriculum must be composed of both theoretical and practical knowledge.

Moll, I., Steinberg, C. Broekman, I., Gewer, A., Bialobrzaska, ., & Allais, S. (2005) cite Young's (2006) suggestion that the vocational curriculum has an orientation towards both disciplines and towards workplaces, and therefore involves two different types of knowledge. Firstly, it must equip its students to be highly competent, skilled practitioners of a particular job, making sure that all jobs are done well from a technical point of view. Secondly, it must equip its students with the theoretical knowledge to comprehend

change and innovation in the economy and to work flexibly so that they can be active participants in a modern economy.

The curriculum examined in this study constitutes a learnership located within the National Qualifications Framework (NQF) at Level 4. It is a work based learning programme that leads to an NQF registered qualification. Learnerships are directly related to an occupation or field of work, for example, electrical engineering, hairdressing or project management.

Overview of NQF Level 4 Learnership

Course Type	NQF Learnership
Description / Definition	A learnership is a work based learning programme that leads to an NQF registered qualification. Learnerships are directly related to an occupation or field of work, for example, electrical engineering, hairdressing or project management. Learnerships are managed by Sector Education and Training Authorities (SETAs). They were introduced by government to help skill learners and to prepare them for the workplace.
Duration	Approximately 12 months
Qualification	Full certificates on Level 2, 3 and 4
Admission Requirements	Different learnerships have different entry requirements. For many learnerships, the minimum entry requirement is a National Senior Certificate or National Certificate: Vocational, but there may be more specific subject requirements or even skills requirements such as computer literacy.

Table 2: Overview of learnership (Saqa.org.za, 2018)

¹The National Qualifications Framework Act 67 of 2008 provides for the National Qualifications Framework (NQF). The NQF is a comprehensive system, approved by the Minister of Higher Education and Training, for the classification, registration and publication of articulated and quality-assured national qualifications and part-qualifications.

It is important to mention that at the time of conducting this research, the Quality Council for Trades and Occupations (QCTO) on its Qualifications Sub-Framework (OQSF) of the NQF has developed and registered 143 new Occupational Qualifications with the South African Qualifications Authority (SAQA). The said qualification in this study, Unit Standard 57887 has not been identified for replacement and deactivation in June 2018. It is therefore my assumption that the findings in this study will still make a valuable contribution to the TVET curricula which remains a high priority for the Ministry of Higher Education and part of the efforts to address the skills gap and unemployment crisis (White Paper of Education for Post-School Education and Training 2013).

In summary, the TVET curricula must satisfy the needs of the learner as well as societal needs, from our South African perspective, economic needs included. According to the Parliamentary Monitoring Group (2015), the purpose and design of the vocational curricula, includes allowing learners to access and master skills, knowledge, values and attitudes for lifelong learning; to continue horizontal education and training; to enter higher education; and to pursue self-employment or employment opportunities. It is a combination of theory and practice. The basis of the vocational curricula is to create solid learning foundations and prepare for vocational life.

2.4. Previous research findings on the NQF Level 4 curriculum

The following section details previous research undertaken in order to gain an understanding of the NQF Learnership curricula, and its effectiveness in meeting workplace expectations.

The Impact Assessment of National Skills Development Strategy II (HSRC (Human Sciences Research Council), 2012) alludes to a number of challenges that befall the metal sector in terms of learnerships. The report claims that the qualification does not prepare learners adequately with the skills level required for industry. Firstly, the curriculum content as well as the trade test requirements are out-dated, with some of the content stemming from the 1950s. Garraway, Joseph., & Wickham (February 2015),

concur that not only are procedural instructional methods used by the college out of date, but the tools and equipment and infrastructure between the college and the workplace exhibits a mismatch. Secondly, the composition of the Quality Council Trade Occupations (QCTO) is made up of role-players representing the educational perspective and only two seats for industry. This perceived mismatch raises concern over the current linkage of the TVET sector with the industry as it can be argued that the TVET sector is not yet sufficiently involved with the industry and what employers need. Thirdly, the report concurs that learnership qualifiers are more holistically rounded in terms of softer skills, which albeit important in the workplace, when it comes to the trade test, these learners are perceived as not being on par with apprentices due to their lack of exposure on the practical side.

The second report alludes to data revealed in a Merseta (2010) survey which reveals a significant gap between industry needs and the availability of a pool of readily available skills to fill this gap. In particular, the shortages in technical and trades skills, suggests that a stronger partnership between industry and tertiary institutions is required in order to ensure that supply responds to demand.

The third report (Mummenthey, C. and Du Preez, R. (2010) critiques the insufficient duration of training (12 - 18 months on average). In order to develop competent artisans, it is recommended that the duration of the training has to be at least 24 months, with a balanced split between practical and theoretical training. This report as with the above two reports emphasises that the learnership content needs to be revised according to the latest industry needs and requirements.

The shortcomings of the NQF Level 4 curriculum in ensuring that sufficient attention is paid to the practical aspect of training is bound to affect the performance of learner's productivity at the workplace. The role of vocational education in the 21st Century should focus on integration of both knowledge and practice between the college and the workplace (Garraway, Bronkhorst, & Wickham, 2015). At the workplace, learners are expected to do the job, thus practical training in the college should expose learners to

real work projects. The college should equip them to complete tasks (albeit with the support of mentors in the workplace) using or drawing on the knowledge acquired during the theoretical training, as well as the opportunities provided for them to practice their newly acquired skills. The challenge arises when learners have not been exposed to certain tools and equipment during their practical training and / or have insufficient amount of time in practical training, and are now expected to contribute to production line by manufacturing certain welding products.

The above research findings call for an evaluation of the NQF Learnership curricula in terms of what type of knowledge is included and excluded, as well as how this knowledge should best be implemented in order to achieve the objectives of the said so meet the expectations of the workplace.

2.5 Theoretical framework for TVET curriculum development

This section addresses the theoretical framework relevant for the development of TVET curricula for the South African context, using the discussion on the role of TVET above. The section under TVET colleges in South Africa has motivated that the TVET discourse be located within a developmental state, which according to Rasool (2014) addresses the South African economic development phases, social-economic development challenges, the learner and community expectations. Given the discussion, the study relies on the *modernist-vocational* theory, which refers to the need to harness education to the economic needs of the modern industrial state, if it is to address the needs of a developmental state.

The table below represents a simplified version of the ideals of a modernist vocational curriculum and how it relates to our NQF Learnership curricula.

2.5.1 An overview of a modernist vocational theory and the NQF curriculum

	PURPOSE	OUTCOME OF CURRICULUM
Modernist vocational curriculum	Foster economic and industrial life intrinsic to modern technocratic society	Knowledge and skills for future producers & consumers in a market economy. knowledge prepare pupils for the world of work critical instrumental and practical skills that are relevant for working
NQF Curriculum characteristics	Aimed at economic growth and development, and industrial advancement	Education and training to be seen as an integrated whole. rejects a rigid division between “academic” and “applied”, “theory” and “practice”, “knowledge”

Table 3: (Carr, 1998)

2.5.2 Purpose of both curricula

According to Carr (1998), the modernist vocational theory has its premise in the need to harness education to reproduce and regenerate the patterns of economic and industrial life intrinsic to modern technocratic society. The main purpose of the curriculum is to provide the learner with the knowledge and skills appropriate to future producers and consumers in a market economy. There is particular emphasis on the need for the curriculum to prepare pupils for the world of work, and Carr’s advocacy relates specifically to the purpose of NQF curricula.

Firstly, the NQF Learnership, as with all vocational curricula, must equip its learners to be highly competent, skilled practitioners of a particular job, making sure that all jobs are done well from a technical point of view. Secondly, it must equip its students with the theoretical knowledge to comprehend change and innovation in the economy and to

work flexibly, so that they can be active participants in a modern economy. This narrow view of the curriculum; although apt for purposes of this study, does not negate the 'child-centred theory of education or 'progressivism' which is aimed at the learners "self-realisation" or "growth" or the "fullest possible development of his / her potentialities". The study further acknowledges that the curriculum should be centrally concerned with fostering the learner's rationality or knowledge or intellect, not primarily for the sake of any extrinsic purpose (the workplace or even society) but for the learners own sake White, 1978). This study though confines the purpose of the TVET curriculum to Carr's (1998) definition.

The Work Integrated Learning (WIL) initiative, which is defined as a purposefully-designed programme that integrates theory and authentic practice in a workplace for vocational, occupational and professional competence displays the purpose of both the modernist vocational theory and the NQF Level 4 programme (Taylor, 2013). WIL is aimed at developing applied competence; which will ultimately lead to greater chances of successful employability of the students. The Council on Higher Education (2011), contend that socialisation to work and introduction to the ethics and values that underpin a professional knowledge base come through work experience itself.

A well integrated WIL system between the relevant stakeholders (workplaces, SETA's and the TVET colleges) will place TVET systems in good stead to emulate the Swiss system. Hoffman & Schwartz (2015) as cited in Taylor, 2013) attributes the most enviable quality of the Swiss system as not just the engagement of a wide range of employers in the system, but the value these employers attach to their role in helping young people grow up and become part of the talent pipeline employers need in order to keep their enterprises productive and competitive. From a South African perspective, a radical mind-set shift is required in order to emulate this method. According to Merseta (2008), no close relationship exists with employers. Companies primary focus is on the business related activities of production, not training, and therefore they are not always equipped to effectively conduct training with learners who are assigned to tasks not related to training.

2.5.3 Outcomes of both curricula

The modern vocational ideology is critical of traditional distinctions between 'high status' academic knowledge and 'low status' practical knowledge in education and training. It seeks to replace the book-based curriculum of classical humanism and the learner-based curriculum of liberal-progressivism with a curriculum which transmits instrumental knowledge and practical skills that are relevant for working life (Carr, 1998).

In a similar vein, a key policy principle in the first White Paper on Education and Training (1995) is that education and training is to be seen as an integrated whole. This assertion implies a “view of learning which rejects a rigid division between “academic” and “applied”, “theory” and “practice”, “knowledge” and “skills”, “head” and “hand”.”

The synergy between the modernist vocational curriculum and the NQF Learnership curricula is evident in the stated purpose and outcome of both curricula. This necessitates that the NQF Learnership curricula consists of both theoretical knowledge and practical knowledge. If we concur with this dual approach to vocational curricula, it would be useful for us to delve deeper into the curriculum content, paying attention to the structure of these different types of knowledge and how it impacts on vocational curricula.

2.5.4 Types of knowledge

There is indeed a plethora of literature encompassing the different types of knowledge; too exhaustive to discuss in great detail in this study. The work of theorists such as Bernstein, Young, Durkheim helps unpack the theoretical and practical knowledge components proposed by the modernist vocational theory, particularly focusing on the complexity of ensuring a balance between the two. This discussion is important as the premise of this study is based on the assumption that learners are not exposed in sufficient proportions to workplace experience in comparison to the theoretical training.

There are three approaches to knowledge which provides a basis for understanding the complexity of ensuring a balanced approach to both theoretical and practical knowledge

being incorporated into the curriculum (Young and Gamble, 2006). The approaches are; the knowledge-based approach, the standards-based approach and the connective approach.

The knowledge-based approach recognises that skills and knowledge needed in the new science-based sectors such as engineering, chemicals and the new electrical industries cannot be developed on the basis of traditional work-based apprenticeships. Technical training in emerging industrial sectors, especially in craft and technician occupations, need access to knowledge of the sciences on which these industries are based and which the learner cannot acquire 'on-the-job'. The major focus therefore of the NQF Learnership curricula and assessments are based on theoretical knowledge encompassing subjects such as Physics, Chemistry and Mathematics relevant to the different industrial sectors (Young and Gamble, 2006).

The standard-based approach is seen as a way of countering what the reformers refer to as the academic drift of most college-based vocational courses. Using a method known as functional analysis, specifically developed by occupational psychologists, this approach is concerned with job design. Curriculum outcomes are identified and stated in terms of what an employee is expected to do, not what he or she needs to know. The short-comings of the knowledge-based approach and the standards-based approach can be addressed by a connective approach, or what Moore (2006) defines as a technical certificate.

As opposed to the knowledge-based approach, the technical certificate emphasises the importance of knowledge acquired at the workplace. In contrast to the standards-based approach, the technical certificate explicitly recognises that knowledge acquired in the workplace is often inadequate on its own and therefore knowledge acquired at the college is a critical component of vocational training.

Whilst this connective approach provides a balanced view to vocational curriculum development, it negates the issue of the actual vocational curriculum content and focuses on who controls the curriculum, employer led bodies or educationists. Even though these employer-led bodies are advised to consult with vocational curriculum

specialists in the development of course outlines, there are no obligations on either to ensure that these recommendations are implemented.

These constraints do not take us very far in terms of ensuring a fair balance between on the job training and off the job training, albeit that it does alert us to the importance of looking at the vocational curriculum from both perspectives.

According to Young (2006), Durkheim points to a distinction between profane and sacred orders of meaning that he found in every society that he studied. While Durkheim refers to *sacred* (theory) and *profane* (practical) knowledge in the curriculum, Bernstein (1996) distinguishes between horizontal (work based) and vertical discourses (theory generated in context of human interaction). This approach emphasises the 'sociality' of knowledge and stresses the differences not the similarities between different types of knowledge. It further explores the different types of social organisation associated with them (Young 2006).

While Durkheim emphasises the differences between the two types of knowledge; he is not implying a judgment about one type of meaning being superior to the other. An everyday activity such as work would be impossible on the basis of the *sacred* alone. Likewise, workplaces restricted to the *profane* would preclude the possibility of envisaging alternatives and leave the workplace devoid of the advent of new technology, as well as the operation thereof. Durkheim is simply making an argument for specialisation; in essence, emphasising the distinctive roles of both orders of meaning (Young 2006).

Moore (2006) criticises Durkheim's theory in that firstly, modern societies have not evolved in a linear fashion; and argues that the workplace is in a constant process of change with the advent of technology. The implication then is that *sacred* and *profane* knowledge are no longer homogeneous categories; each pervade each other. We therefore cannot view the curriculum as two distinct forms of knowledge. Secondly, despite his insistence that *sacred* and *profane* knowledge only differentiate between

different orders of meaning, in practice, they become the basis of division between academic and vocational qualifications and between mental and manual labour. Durkheim's work challenges us to address the issues of crossing the boundaries of different types of knowledge which is a fundamental issue of a vocational curriculum. Seeking the interrelatedness between on-the-job knowledge and off-the-job knowledge as indicated on the NQF Learnership curriculum is an important aspect of this study.

Below is a brief summary of the types of knowledge relevant for this study.

SUMMARY OF TYPES OF KNOWLEDGE

THEORISTS	TYPE OF KNOWLEDGE - THEORY	TYPE OF KNOWLEDGE- PRACTICAL
Young	✓ Disciplinary knowledge ✓ Context Independent	✓ Job specific knowledge ✓ Context Dependent
Durkheim	✓ Sacred knowledge ✓ Theory - generated in context of human action ✓ Conceptual / Abstract	✓ Profane knowledge ✓ Practical / everyday /practical/ on-the-job ✓ Concrete experiences
Bernstein	✓ Vertical discourses /theoretical ✓ General/ explicit / coherent ✓ Bodies of codified knowledge / subject area disciplines ✓ Hierarchically organised bodies of knowledge, e.g., natural sciences ✓ Segmentally organised into specialised languages, e.g., social sciences and the humanities	✓ Horizontal discourses /everyday ✓ Local, segmented organised, context bound ✓ Oral, specific, tacit, multi-layered

Table 4:Authors own

2.5.5 Framework for different types of knowledge

From the foregoing discussion on the different types of knowledge, the following framework arises and provides an analytic lens for this study.

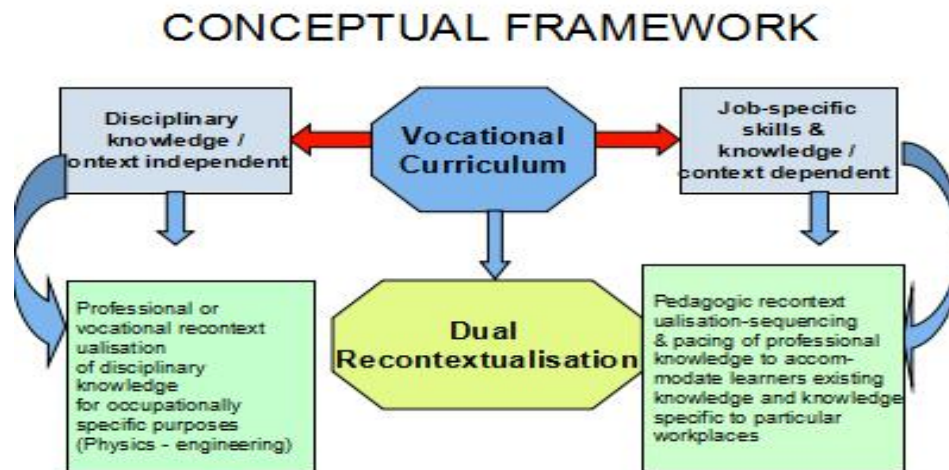


Figure 1: *Conceptual framework* (Young, 2006)

On the surface, it appears as if the call for a curriculum which encompasses both theoretical and practical knowledge and skills is an easy feat but according to (Gamble, 2004), the relationship between the two components is actually a complex one which cannot be specified directly because they refer to two different kinds of knowledge.

2.5.6 Knowledge dual recontextualisation in vocational curriculum

Bernsteins' theory of recontextualisation is of importance for this study. According to Bernstein (2000), the process of recontextualisation entails the principle of de-location (selecting a discourse or part of a discourse from the field of production where new knowledge is constructed) and a principle of re-location of that discourse as a discourse within the recontextualising field. In this study the balance between the theoretical knowledge the learners have acquired at the college and the 'opportunities' afforded them to practically apply in the workplace is of significance. What is also relevant is how certain knowledge's are acquired at the workplace which cannot be gained at the college through theoretical knowledge.

According to Young and Gamble, the vocational curriculum involves two steps in the re-contextualisation of disciplinary knowledge. Firstly, according to Barnett (2006) as cited in (Young, M. and Jeanne, G. (2006), workplaces generate technological and organisational problems which, given the enormous sectoral diversity, are usually sector-specific but which often transcend the details of particular jobs or particular organisational settings. Direct observation or what Barnett calls “Sitting by Nellie” is however of little use in acquiring other more abstract knowledges, e.g. molecular structures or of financial regulations, which may be vital to particular occupations. This observation takes us back to the argument that practical knowledge on its own is insufficient in the TVET curriculum.

The Curriculum 2005 Review Report makes it clear that vocational curriculum displays an overriding emphasis on integration – across disciplines, and between school knowledge and the learners’ experience of everyday life. A conceptualisation of the links between workplace activity and disciplinary knowledge is needed. For this purpose, a further and different process of *re-contextualisation* is needed in which disciplinary knowledge(s) are selectively restructured having regard to the technological or organisational problems encountered in specialised work settings (Hoadley & Jonathan, 2009).

The strategies governing such recontextualisation derive from the demands of professional practice, not from any considerations of teachability or learnability (Barnett 2006 as cited in (Young, M. and Jeanne, G. (2006). For this recontextualised knowledge to be incorporated into vocational curriculum, a further process of *pedagogic recontextualisation* is required. What this means for this study is that the workplace setting and requirements; as well as the lecturer’s skills and knowledge as a subject matter expert, need to be taken into cognisance in the delivery of the curriculum. Providing adequate relevant workplace experiences for learners would greatly enhance opportunities for the learner to integrate some of the theoretical discourse they have been exposed to at the college in a practical manner. It further means that the role of a

mentor in the workplace who is able to guide and support the learner becomes a necessity as the learner responds to the workplace challenges.

Admission to a learnership programme requires the learner to sign a contract with an employer, resulting in a significant increase in employment. Despite this positive outcome, the system, according to Mummmenthey and Du Preez (2010), does not yet deliver a satisfactory level of the learners' applied competence and is consequently not effective in achieving the actual work readiness of learners. A call for more technical and practical competence training over a longer period of time is required if adequately skilled artisans are to be developed for the industry. NQF Learnership graduates cited by Mummmenthey and Du Preez (2010), demonstrated a lack of problem solving skills to understand how systems work and diagnose faults which prohibits them from performing productively in the workplace. Davies, T. and Farquharson, F. (2004) attest to this claim that NQF Learnership graduates were not being adequately developed, partly because of shifts in technology, with the increased use of computerized diagnostics, and partly because of a conflict between production time and training time.

Secondly, vocational pedagogy necessarily involves 'boundary crossing' which requires that the teacher involved in 'boundary-crossing' pedagogy needs reasonable familiarity with the 'discourses' on either side of the divide, and the recontextualisation strategies that have been used to create the new 'pedagogic discourse' in the available learning support materials and texts (Barnett 2006). S/he needs a degree of insight into the scope and nature of the 'reservoir' of disciplinary knowledges on which the particular syllabus has drawn, as well as of some of the realities of the workplace settings to which this (appropriately refashioned) knowledge is deemed to be relevant (Barnett, 2006 as cited in (Young, M. & Gamble, J. (eds). (2006). A safe assumption therefore would be that college lecturers are familiar with practical nature of the workplace.

According to Shay (2012), the different knowledges are not equal – theoretical knowledge is socially powerful knowledge. Thus the crucial implication is that if learners are to have access to powerful knowledge, then all curricula, including vocational, must

include theoretical knowledge. More specifically, all curricula must include epistemic access to theoretical knowledge.

2.8. Conclusion

Cognisance is taken of Kraak's (2003) caution that the curriculum is most often a hybrid of many types of knowledge, whilst advocating that the NQF curriculum has its foundation in the modernist vocational theory, advocating theoretical and practical knowledges. It is also acknowledges that the curriculum in the real world seldom, if ever, matches the ideal of advocating the neat compartmentalisation of knowledge as proposed by theorists in this study, namely, Durkheim and Bernstein s. However, the modernist vocational theory and especially the work of these theorists provides us with a basis against which we can review the current curriculum debate in South Africa. It also aids in the analysis of the NQF curriculum in terms of the characteristics of contextual (practical) knowledge and conceptual (theoretical) knowledge and the importance of ensuring and interrelatedness between the two ((Jansen and Hoadley, 2012).

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

Babbie and Mouton (2001) state that the striving for knowledge and understanding is an essential part of being human because of the inherent curiosity humans have about their world. It is because of curiosity pertaining to the nature of the NQF Level 4 curriculum, in relation to workplace requirements, that I conceptualised the study, to contribute to current knowledge and understanding of the practices in the TVET field. Fox and Bayat (2007) equally contend that human beings are inquisitive by nature, persistently identifying issues and problems, and raising questions about and finding solutions within the world in which they live. This quest for knowledge constitutes research, which is defined as a study or investigation in order to discover facts or gain information. Since this study constitutes the scientific investigation into the relationship between the NQF Learnership Welding curriculum and the workplace, particularly whether the former meets the needs of the latter, the study is empirical in nature. Data collection has therefore relied on a systematically exploratory research design performed under a specific set of conditions, discussed throughout this chapter (Gravetter et al., 2009).

3.2 Research design

According to Mc Millan (2012), research design refers to the plan and structure of the investigation in order to obtain data to answer the research questions. Kothari (2004) defines it as the arrangement of conditions for collection and analysis of data, in a manner that aims to combine relevance to the research purpose with economy in procedure. The research design constitutes the blueprint for the collection, measurement and analysis of data. Thus the selection of exploratory research design was based on the fact that the NQF Level 4 Learnership curriculum is a relatively new qualification, developed in line with governments expectations to alleviate acute skills shortage and high unemployment rate currently experienced in South Africa. The

advantages of utilising an exploratory research design is that there is not much research on the NQF Level 4 curriculum in relation to workplace requirements. Considering that exploratory studies typically addresses a subject of study which is relatively new (Babbie and Mouton, 2001), it is envisioned that this research will lead to insight and comprehension regarding the aforementioned phenomenon. This insight is illuminated as a result of the intensive interaction undertaken with the selected research methods which includes in-depth interviews, questionnaires, document study and also investigating relevant literature reviews (Babbie and Mouton, 2001).

The second advantage of using an exploratory design is linked to the necessity of gaining an in-depth understanding of the objectives of the TVET sector for the NQF curriculum, in relation to the proposed theoretical framework which underpins this study. This insight provides us with a basis for answering the research question, which is concerned with examining the effectiveness of the NQF Level 4 curriculum in meeting the needs of the workplace. The selected research design therefore allows for the examination of the types of knowledges; theoretical and practical, as advocated by the modernist vocational theory and particularly whether these types of knowledge's are evident in the NQF Level 4 Learnership curriculum. The nature of exploratory design is to help understand the problem, through the use of qualitative data obtained using questionnaires, interview sheets as well as a literature review study has therefore been selected. Similarly, Dudovskiy (2017) states that the researcher uses an exploratory research design with the intention of generating a posteriori or inductive hypotheses by examining a data-set and then looks for a potential relationship between variables, that is, the curriculum and workplace requirements. In this study I understand the relation between the identified variables, but lack knowledge of the impact the one has on the other. This idea about the relation between the variables arose from informal observations and discussions with workplace employers about newly graduated NQF Level 4 Learnership Welders, who entered the workplace and were deemed unproductive or unable to meet the standards and requirement of the workplace.

This study concedes that a distinct limitation with exploratory research is that it generally utilises small sample sizes and thus findings are typically not generalisable to the

population at large. Exploratory research design does not aim to provide the final and conclusive answers to the research questions, but merely explores the research topic with varying levels of depth (Singh, 2007).

3.3 Research approach

Fox and Bayat (2007) advocate that the various types of research can be divided into two broad approaches, namely quantitative and qualitative research. Quantitative research typically reduces data to means, medians, correlations, and other summarising statistics. Qualitative research entails constructing interpretive narratives from data and trying to capture the complexity of the phenomenon under study. According to Leedy (2010), it is not unusual for researchers to use both these approaches in what is called a mixed - method design. Considering the nature of the current study, qualitative approach was relevant and Kothari (2004) defines it as research concerned with the subjective analyses of attitudes, opinions and behaviour. This study was concerned with the participants' perceptions of the said curriculum in relation to workplace requirements, locating it to qualitative study.

3.4 Pilot study

Kothari (2004) advises that a pilot study be conducted for testing the questionnaires and/or interview sheets. He defines a pilot survey as the replica and rehearsal of the main survey. Such a survey, being conducted by experts, brings to light the weaknesses (if any) of the questionnaires and also of the interview techniques. From the experience gained in this way, improvement can be effected. The pilot study constituted one participant representing each of the three identified groups, that is, one lecturer, one curriculum developer and one workplace employer. This was done in order to determine whether the full study would elicit the desired information through the set questionnaire and interview sheet; and whether the method of questioning would be effective in attaining the depth of information sought. It was envisaged that the lessons learned as a result of the pilot study would yield rich responses as predicted by (Given, 2008).

Initially, the same questionnaire was used for the curriculum developers and the lecturers to gather data on their perceptions of the NQF Level 4 Learnership curriculum in relation to workplace requirements. The pilot study highlighted the need for the curriculum developers and the lecturers to have different questionnaires and interview sheets in order to determine and contrast their different perspectives on the curriculum (See Annexures 2 - 7). Also, it became evident that the inclusion of qualities and core competencies required of a welder was an essential tool in order for the three groups of participants to compare their views on both. The necessary amendments were made.

3.5 Research methodology

Mouton (1996) describes methodology as a way of systematically solving the research problem. It entails studying the various steps that are generally adopted by a researcher in studying his research along with the logic behind it. Babbie and Mouton (2001) define research methodology as the methods, techniques, and procedures that are employed in the process of implementing the research design, as well as the underlying principles and assumptions that underlie their use. Since the research design employed in this study encompasses an exploratory nature, the research methods relied on the use of questionnaires, semi-structured individual interviews, and documents, namely, the SAQA Unit Standard (See Appendix 8) and the Welding school workplace requirements (Weldingschools.com, 2018) (See Appendix 9) in order to gain an understanding of the relatively new topic. Primary data was collected personally from participants who were involved in the NQF curriculum either from a lecturing, or a curriculum development or an employer perspective.

3.5.1. Questionnaire

Though questionnaires are essential to and most directly associated with survey research, they are also widely used in experiments, evaluation research, and other data-collocation activities (Babbie and Mouton, 2001). The questions developed for purposes of this study were all the same with minor phrasing deviations to fit specific groups, that is, as a workplace employer, or a curriculum developer or a lecturer. Questions were

aimed at extracting their perceptions regarding the correlation between the curriculum and the learners' productivity at the workplace, and therefore dealt with the skills and knowledge the curriculum covered in relation to the skills and knowledge required in the workplace (See Appendix 2 - 4). Babbie and Mouton (2001) allude to paying attention to the following components of a questionnaire: the general questionnaire format, the format for respondents, the use of contingency questions, the use of matrix questions and the use of including instructions. The questionnaire administered in this study was semi-structured, which included both closed and open-ended questions. Closed questions were easier for the participants to answer and their answers could be easily compared. Also, they were easier to code and to analyse statistically. The open questions, although more time consuming, provided an opportunity in the study to qualify and clarify responses. These types of questions also allowed for complex issues to be addressed.

In order to ask several questions that possibly have the same set of answer categories; the study incorporated matrix questions. Once the participants for the questionnaires were identified, they were contacted telephonically or in person at their place of work, in order to gain their approval to participate in the research. The questionnaires were issued to the participants who completed them at their leisure. Participants were at liberty to seek clarity as necessary. Data stemming from the questionnaire were collected personally from participants who were close by, while some participants elected to email their responses.

3.5.2 Interviews

Kothari (2004) defines interviews as a method of collecting data which involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. Interviews typically take on the form of personal interviews; as in the case with this research study, or telephone interviews. The reason for the choice of the former is that this study required a more intensive discussion, where it was hoped that comprehensive answers to open-ended questions would be elicited from the respondents. Another advantage of this method was the opportunity for the body language of participants to be interpreted

and possibly further investigated such as any level of discomfort the participant may have felt with the questions.

Thus, telephone interviews were excluded as it was envisaged that they would not have had the same effect. Babbie and Mouton (2001) caution that it is much easier to terminate a telephone interview than to do it in a personal interview as the respondent is more likely to attend to more “urgent” matters during a telephone interview than during a scheduled personal interview. In order to eliminate this risk, prior arrangements were made with the participants in terms of the allocated time for the interview and to allow them to schedule in the interview. Since the nature of exploratory research is to gain an understanding of a topic in greater depth, open-ended questions proved to be extremely useful in this regard. (See Appendix 5 - 7).

The semi structured interviews allowed for topic areas to be fully explored and thus provided fruitful robust dialogue where issues were clarified and a greater insight into the topic was gained (Merriam, 2009). It aimed at clarifying themes, trends, or content emerging from the questionnaires, thereby addressing a few central issues. Data emerging from the interviews provided insight into the interface between the theoretical and practical components of the curriculum during delivery of training; the qualifications and experience of lecturers and curriculum developers and how this impacts on the delivery of the programme; lack of consultation between stakeholders, and recommendations on how to close the gap between the curriculum and workplace requirements. Equally important, was that the interview sheet allowed for the use of standard questions with one or more individually tailored questions to get clarification or to probe the participants reasoning. Similar to the questionnaire, the interview sheet included a combination of closed-ended questions and open-ended questions to gather the participants’ perceptions. Data gathered from the closed-ended questions were easily quantifiable and conclusive in nature. They were also easy to code and therefore useful for gaining statistical data such as how many of the participants viewed the NQF Level Learnership 4 curriculum as meeting the needs of the workplace or what their ratings were regarding the skills and knowledge required of the learner in relation to workplace requirements.

These face-to-face semi-structured interviews had the distinct advantage of establishing rapport with the participants and it was therefore easier to gain their cooperation (Babbie and Mouton, 2001). The interviews were conducted with one representative from each group, that is, one curriculum expert; one lecturer and one workplace employer. These interview sessions were conducted at the convenience of the participants and were therefore held at their respective workplaces in all instances. The duration of the interviews ranged from one hour to two hours. The reason for this length of time ensured a meaningful discussion and for the topic to be fully explored. Participants generally engaged in a full discussion. Questions were therefore carefully designed in a logical order in order to initiate a dialogue regarding their views on the NQF Learnership curriculum in relation to workplace requirements in a coherent manner. Where participants deviated from the sequence, it was much easier to bring them back on track using the questionnaire as a guide.

3.5.3 Document analysis

Merriam (2009) cites written, oral, visual or cultural artifacts as sources of documents. Public records, personal documents, and physical material are types of documents available to the researcher for analysis. This is attributed to the strength of documents as a data source, since they already exist in the situation and do not intrude upon or alter the setting in ways that the presence of the investigator might. In order to assist in the analysis of the effectiveness of the NQF Level 4 Learnership curriculum in meeting workplace requirements, it was necessary to study relevant documents both from the curriculum perspective as well as a workplace perspective. A comparison was therefore drawn between the outcomes of the curriculum and the expectations of the workplace using the NQF Level 4 Learnership welding curriculum (SAQA) Unit Standard 57887 (See Appendix 8), and from a workplace perspective, job descriptions and requirements for a welder was analysed using the Transnet Career Guide as a research tool ((Weldingschools.com, 2018) (See Appendix 9 for list of competencies required of a welder). The workplace document provided an informative outline on the specific skills

and knowledge required of a welder from a workplace perspective. It further served as a tool to compare the contents of the curriculum and the needs of the workplace. The document in essence became the central focus point in comparing the perceptions of the different parties, with reference to the curriculum and workplace expectations which was taken directly from the document study.

3.6. Sample

Given (2008) finds it easier to conceptually understand the term population when it is contrasted with the concept of a sample. A sample, in contrast to a population, includes only a portion of the population. In the case of this research, I decided that it was not financially or chronologically feasible to study the whole population, which would be all workplace employers involved in the recruitment of NQF Level 4 learners, all colleges who offer the NQF Level 4 Learnership curriculum and all curriculum developers involved in the design and development of the said curriculum. A subset of this population or rather, the sample was selected and studied, guided by geographical considerations which meant that the sample was confined to the Gauteng province. Approaches to selecting samples are typically divided between probability sampling and non-probability sampling, where the former uses a group's size in the population as the sole influence on how many of its members will be included in the sample, while the latter concentrates on selecting sample members according to their ability to meet specific criteria. This is done in order to have a more manageable group for the purposes of the intended research (Given, 2008). The nature of this study required a non-probability sampling strategy since definite criteria attached to the participants was essential such as experience, involvement and knowledge of the NQF Level 4 Learnership curriculum and learners.

Kothari (2004) lists four types of non-probability sampling strategies; namely, reliance on available subjects, purposive or judgmental sampling, snowball sampling and quota sampling. Since I had to rely on my judgment and existing knowledge of the population, its elements, and the nature of the research aims; purposive sampling was relevant. The

following criteria were therefore attached to the participants in order to aid meaningful discussions

- ✚ **Lecturers** – who held a minimum of five years lecturing experience in NQF Level 4 Welding curriculum
- ✚ **Curriculum developers** – who held a minimum of five years' experience developing relevant NQF Level 4 Learnership curriculum
- ✚ **Workplace employers** - who had employed NQF Level 4 Learnership graduates within the last 2 years.

The first sample was drawn from TVET educational institutions within Gauteng where this particular qualification was offered. The second sample was drawn from all engineering companies which had employed NQF Level 4 Learnership graduates within the past two years. The third sample was drawn from curriculum developers who had a minimum of five years' experience developing relevant NQF Level 4 Learnership curricula. To solidify the results, grouping participants according to pre-selected criteria relevant to the research question was essential, that is, lecturers, curriculum developers and workplace employers (Family Health International, n.d.). Another factor which had to be considered in the sampling strategy was what Given (2008) calls a systematic approach to sampling. These criteria called for a combination of the respondents' unique characteristics, with respect to their experience with the NQF Level 4 Learnership curriculum, their ability to speak and comprehend English as well as their ability to give informed consent. Their geographical representation also served as a criterion as travelling costs and accessibility had to be factored in.

The table below illustrates the number of questionnaires and interview sheets completed by the selected participants, that is, three lecturers, three curriculum developers and three workplace employers for the questionnaires. For the interview sheets, one participant per group was selected, that is, one lecturer, one curriculum developer, one workplace employer.

	Questionnaires	Interview sheets	Total
Lecturers	3	1	4
Curriculum developers	3	1	4
Workplace employers	3	1	4
Total	9	3	12

Table 5: Selected number of participants

None of the participants were female albeit that this did not form part of the criteria for participation in the study.

3.7. Fieldwork

3.7.1. The procedure followed during the investigation

The fieldwork for the collection of data commenced after the study supervisors and the ethical board approved the study. The process started with the submission of an application to the Department of Higher Education for the study (See Appendix 11). The process of finding workplace employers to participate in this study was challenging because not many employers had experience with the learners undergoing the NQF Level 4 Learnership training programme. Once the four workplace employers were found, appointments were set up and interviews were conducted at the convenience of the participants. Each participant was given an identification code for identity protection purposes.

3.7.2 Field notes

Gibbs (2009) defines field notes as contemporaneous notes taken while in the research setting. Field notes were crucial for this qualitative study as they provided the descriptive details of the participants, places, things and methods as well as reflections on data, patterns, and the process of research. These details formed the context and quality control that shaped multiple qualitative data points into articulated, meaningful, and integrated research findings as described in Chapter 4, the findings. (Given, 2008). Field

notes represented the descriptive elements which recordings were not able to demeanour, facial expressions, gestures, and /or off mic comments. These factors helped place the comments provided by the participants into context.

3.8. Data analysis

According to (Leedy., n.d.), data remains mere pieces of information, facts, codes and statistics without the mind of a researcher who can interpret the data and arrive at logical conclusions as to their meaning. The researcher is able to interpret how much two or more variables are interrelated, more generally, how the data stack up. Jones (2005) views data analysis as the most pivotal facet of all the various research facets. According to AlYahmady and Al Abri (2013), qualitative data analysis is a “process of bringing order, structure and meaning to the mass of collected data”. This study entailed pursuing the relationship between categories and themes of data seeking to increase the understanding of the phenomenon; the curriculum and the workplace expectations. This definition highlights the crucial role that data analysis has to play in scientific research, especially as I have to yield valid and reliable findings in order to contribute to the existing body of knowledge pertaining to the TVET curriculum field. Data analysis is possible because of our human ability to develop and engage in several general strategies through which we can most effectively reason about and better understand worldly phenomena; such as critical thinking, deductive logic, inductive reasoning, the scientific methods, theory building and collaboration with others (Leedy, 2010). These strategies work in synergy and cannot be compartmentalised and used in isolation in the research process.

One of the strategies used predominately in this study has been the inductive approach whereby specific comments were made regarding the performance of newly recruited NQF Level 4 Learnership learners at the workplace. According to feedback from workplace employers, these learners were not productive from the onset of employment. Assumptions were then made based on this feedback relating to the disconnect between the learner performance (curriculum outcomes) and workplace expectations (Leedy, 2010). Data from the questionnaire and the interview sheets were analysed in order to reduce and make sense of the vast amounts of information gathered from the

sources through the use of different research methods so that emerging impressions could shed light on the research question. This data included both qualitative data and quantitative data.

3.8.1 Data analyses of quantitative data

Quantitative data was concerned with data such as the years' experience the participants held, the matrix questions which dealt with the level of attachment pertaining to skills and knowledge embedded in the curriculum and also according to workplace expectations. The raw quantitative data was imported according to the different questions, into an electronic spreadsheet, which is a software programme that allowed me to manipulate data displayed in a table (Microsoft Excel). By way of illustration, the data gathered on the participant's responses as to their level of importance they attach to skills and knowledge; was inserted in the rows which contained the particular skills and knowledge while the columns allowed the participants to record their views. The totals for each participant within each group was entered into the Excel spreadsheet which made simple calculations, producing overall results to these questions for each group (See Appendix 19). The spreadsheet allowed for graphing capabilities. After highlighting the appropriate sections of the data, the programme automatically produced graphs from the inserted data. In this instance, bar graphs were utilised to visually illustrate relationships in the data. The database was populated with all the responses arising from the questionnaires; which were previously designed as a numbered code, for instance, the values attached for each quality essential for a welder was numbered from 1 - 10 and the scale used was: **1 - not at all** (0 - 20%); **2 - Very little** (0 - 20%); **3 - Fairly well** (40 - 60%); **4 - Very well** (60 - 80%) and **5 - Exceptionally well** (80 - 100%). (See Annexure 2 question 4. It was essential therefore to assign numbers to responses prior to entering the data. The themes relevant to the quantitative data questions which are depicted by the graphs are: the perceptions of the participants regarding learner readiness, qualities of a good welder. the time allocation of practical and theory inherent in the curriculum, the qualifications and experience of lecturers and curriculum developers in either lecturing the programme

or developing material, the consultation processes, and factors to consider when designing curricula.

Presenting the quantitative data into graphic forms promoted an enhanced understanding of the problem and the study.

3.8.2 Data analyses of qualitative data

The interview schedule included perceptions and recommendations on the following themes: A pre-defined framework - which reflected the aims, objectives and interests of this study was used to examine the findings. This approach allowed for closer attention on particular answers while putting aside other less relevant data for the time being. According to (Pope et al 2000 as cited in The Open University, n.d.), this approach is called a 'framework analysis' (See Annexure 5 - 7).

Some of the themes which emerged were:

#	Emerging Themes
1.	Changing work environments which colleges / lecturers did not understand or take cognisance of while delivering the programme
2.	Lack of resources at colleges or relevant practical opportunities for learners to engage in simulated work activities
3.	Time allocation for both theoretical and practical components
4.	Lack of synergy between role players
5.	Absence of workplace mentors

Table 6: Emerging themes from study

These findings are discussed in greater detail in the next chapter but generally reveal that there exists inconsistency between the outcomes of the NQF Level 4 Learnership curriculum, and the expectations of the workplace and that the learner is not adequately prepared for the workplace, but not for reasons originally claimed by the participants which alluded to lack of practical skills training within the curriculum.

3.9 Ethical considerations

According to Merriam (2009), a 'good' qualitative study is one that has been conducted in an ethical manner. The validity and reliability of a study depends to a large degree upon the ethics of the researcher. In conventional usage, the term validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration. This study constitutes an exploratory nature and therefore sought to ensure that clear and unequivocal evidence with which to answer the research question, was gathered (Babbie and Mouton, 2001). Since NQF Learnership Level 4 graduates are groomed for productivity in the workplace; a study of the curriculum in relation to workplace requirements (skills and knowledge required of a welder) was undertaken. Inferences could therefore legitimately be made from the findings of the structure of the curriculum and using the modern vocational theory as a basis for establishing workplace requirements, construct validity is exhibited.

Secondly, despite exploratory research generally utilising small sample sizes, it is possible to assure population validity as the sample constituting this study can be extrapolated to a population as a whole (Explorable.com, 2018). That is, specific criteria was attached to the selected participants, all having experience with the NQF Learnership curriculum as well as graduates of this programme.

Achieving reliability is challenging because each interview is unique in some way (Le.ac.uk, 2018). This variation can be due to the interactive nature of the interview and the various biases and limits that impact on human decision-making. In order to avert this risk, more than one type of research method for the same participation group was used. That is, both questionnaires and semi structured interviews were utilised to

assess the same phenomena (the said curriculum and workplace requirements). Thus the study displayed a parallel form of reliability.

Leedy (1993) describes the principles of ethical propriety as simple considerations of fairness, honesty, openness of intent, disclosure of methods, the ends for which the research is executed, and a respect for the integrity of the individual. The obligation of the researcher is to guarantee unequivocally individual privacy, and an informed willingness on the part of the subject to participate voluntarily in the research activity. Gravetter et al., (2009) state that researchers are usually governed by a set of ethical guidelines that assist them to make proper decisions and choose proper actions. We are therefore advised by Babbie and Mouton (2001) on the importance of understanding and being aware of the general agreements among researchers about proper and improper conduct during scientific enquiry. The following section highlights some of the important ethical considerations employed during this study.

3.9.1 Informed Consent

Research participants were fully informed of the procedures and risks involved in the research, and they gave their consent to participate. In any research study there are different types of risks such as physical, psychological, financial, legal or social. For the curriculum development experts; psychological risks such as inconvenience or discomfort were a possibility as they would have to schedule the interview in their work schedules. In addition, the possibility that they would interpret the interview as their work being judged could leave them feeling vulnerable and anxious. In order to mitigate this risk; interviews were scheduled at their convenience and also assurance given that no judgment would be made regarding their work. For workplace employers similarly, psychological risks were anticipated such as inconvenience and discomfort due to having a stranger enter their organisations and ascertain the productivity of employees. Mitigating strategies were aimed at focusing entirely on the interview questions and maintaining a non-judgmental attitude. Finally, for lecturers the psychological risks, such as anxiety and stress at having a stranger enter their college and evaluate their knowledge of the workplace expectations; the curriculum and how well suited the two

are; was a reality. Mitigating strategies focused on reassuring the lecturers that the research was not a fault finding exercise. An unbiased, non-judgmental attitude was maintained as well as collaboration with the lecturers from the onset of the interview.

Participants were informed of their right to withdraw from the research at any time. Gravetter et al., (2009) advocate that while it is imperative that the participant is given complete information about the research and their roles in it before agreeing to participate; in some instances, this is not always possible. For example, if participants know prior to the research that one treatment or solution is supposed to produce better performance, they may adjust their own levels of performance or answers in order to satisfy the researcher. With regard to this research study, contrary to Gravetter's et al., (2009) justification of deception, I was in a position to provide the participants with full details surrounding the study and there was no bias to persuade the participant to favour a particular outcome.

3.9.2 Voluntary participation

Social research often, though not always, represents the intrusion into people's lives according to Babbie and Mouton (2001). It also requires the participants to reveal information about themselves to strangers, often what they have not disclosed to others. This principle was strongly adhered to for the duration of this study, none of the participants were forced to participate in the research and they were free to withdraw at any time. Participants therefore signed documents agreeing to participate in the study. None of the participants withdrew from the study. In addition, participants were not put in situations where they might have been at risk of both physical and psychological harm as a result of their participation due to the personal nature of qualitative research (Fox and Bayat, 2007).

3.9.3 Privacy

In the context of research, the right to privacy refers to the freedom of the individual to determine the time and circumstances under which, and, most importantly, the extent to which his/her attitudes, beliefs, behaviour and opinions are to be shared or withheld

from others. All interviews were conducted according to the availability of the participants. The research guaranteed the confidentiality of participants, by assuring them that no identifying information would be made available to anyone not directly involved in the project. The stricter standard of anonymity, which ensured that participants would remain anonymous throughout the research, was adhered to. Thus their identity was ensured despite the revelation of necessary information. Equally important is what Gibbs (2009), refers to as the process of anonymisation when writing up the research or when depositing the data in a public archive so that other researchers can have access to it. This process of anonymisation keeps the names of people and places safe for participants, especially if they are involved in illegal activities. Since this sample was relatively small, an anonymised copy was produced immediately after transcription.

3.10 Limitations of study

The limitation of this study deals with the small number of TVET colleges who participated in the research. Time constraints as well as financial implications did not allow the interviewing of all 50 public colleges as well as private colleges throughout our country. I am therefore acutely aware that the results of this research study will not be representative of the entire TVET spectrum. Since this research is exploratory in nature, it solicits views of the identified stakeholders on the effectiveness of the curriculum in meeting the requirements of the workplace; it is envisaged that more intense studies can and will stem from this research. The data analysis, interpretation and recommendations from this study will further guide future research within this ambit.

3.11 Summary

The aim of this report is to demonstrate a scientific analysis of the effectiveness of the NQF Level 4 Learnership curriculum in relation to workplace requirements. A major emphasis of the research approach utilised was to ensure that generalisation and applicability were possible across the identified groups. Criteria was therefore attached to all participants which was strongly adhered to. The trustworthiness of the study is

underpinned by the multiple sources of data collected and analysed, namely the interview sheets, the questionnaires, the document analysis, the literature reviews and the field notes. Given that policy makers seek feasibility in their decision-making it is crucial that the findings yielded within this report generate confidence among key stakeholders and role players within the ambit of the Department of Higher Education and therefore the use of multiple sources of data.

The use of a qualitative research approach which is exploratory in nature has provided the distinct advantage of grasping the subjective meaning of issues relating to the nature of the NQF Level 4 Learnership curriculum and the workplace expectations from the perspective of the participants. It is envisaged that this aids in discovering new aspects in the situation under study and in developing hypotheses or a theory from these discoveries (Flick 2011).

CHAPTER 4

FINDINGS AND ANALYSIS

4.1 Introduction

This chapter presents findings on data gathered from lecturers, curriculum developers and workplace employers involved with the NQF Level 4 Learnership Welding curriculum. The data specifically examines their perceptions on the effectiveness of curriculum in meeting the needs of the workplace.

Quantitative data was gathered from the three groups of participants regarding their perceptions on the productivity of NQF Level 4 learners in the workplace, the values they attached to skills and knowledge, time allocation to both theory and practical training; the experience of lecturers and curriculum developers, the consultation processes, and their responses regarding factors to consider when designing curricula.

An in-depth qualitative discussion then analyses these findings and provides further clarification on the research findings.

4.2. Findings on quantitative data

4.2.1 Participants perceptions: Does the NQF Level 4 curriculum meet the needs of the workplace

Gaining an understanding on the perceptions of the participants regarding the effectiveness of the NQF Curriculum was needed as a starting point to unpack the research question: *To what extent, if at all, does the NQF Level 4 Learnership Curriculum meet the needs of the workplace.* The answers provided were expressed in Yes or No forms.

Lecturers' perceptions

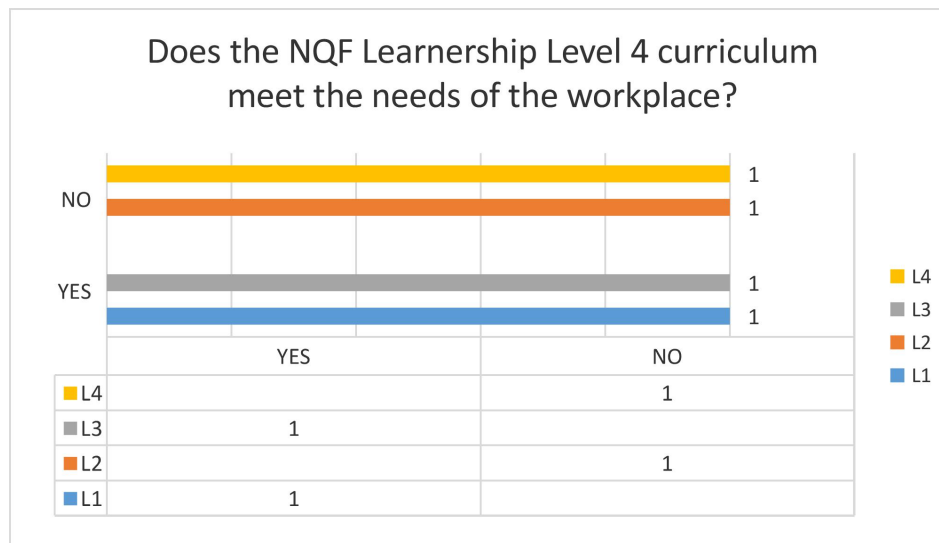


Figure 2: Perceptions of lecturers: Does the NQF curriculum meet the needs of the workplace

The findings suggest that lecturers are equally divided on the matter whether the NQF Learnership Level 4 Curriculum meets the needs of the workplace. 50% agreed that the curriculum was effective whilst 50% disagreed.

Curriculum developers' perceptions

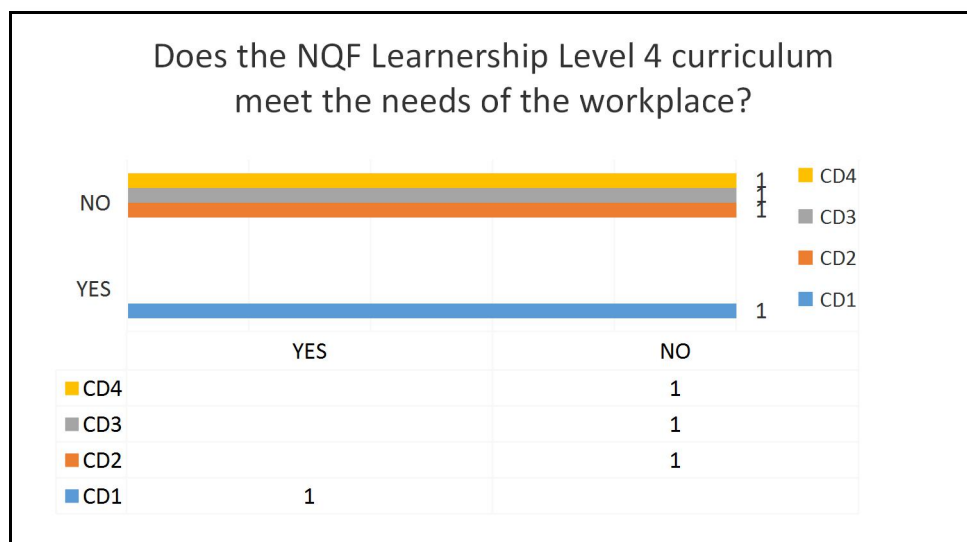


Figure 3: Curriculum developers individual perceptions

The findings among the group of curriculum developers displays a larger disparity than with the lecturers. 75% of curriculum developers viewed the NQF Learnership Level 4 Curriculum as not being effective in meeting the needs of the workplace. This majority displays support for the claims made within the study that the Curriculum is not able to meet the needs of the workplace (See Chapter 2; 2.5, Previous research findings).

Workplace employers' perceptions

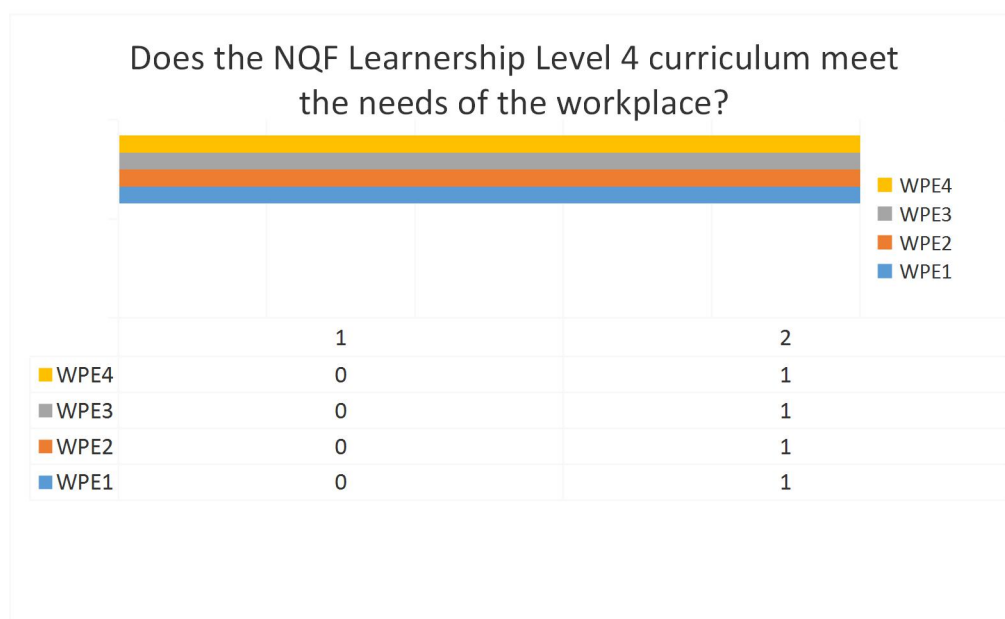


Figure 4: Workplace employers individual perceptions

An overwhelming majority of workplace employers indicated that the NQF Learnership Level 4 curriculum does not meet the needs of the workplace.

This set of bar graph measures the perceptions of the three different groups of participants:

Overall perceptions of participants

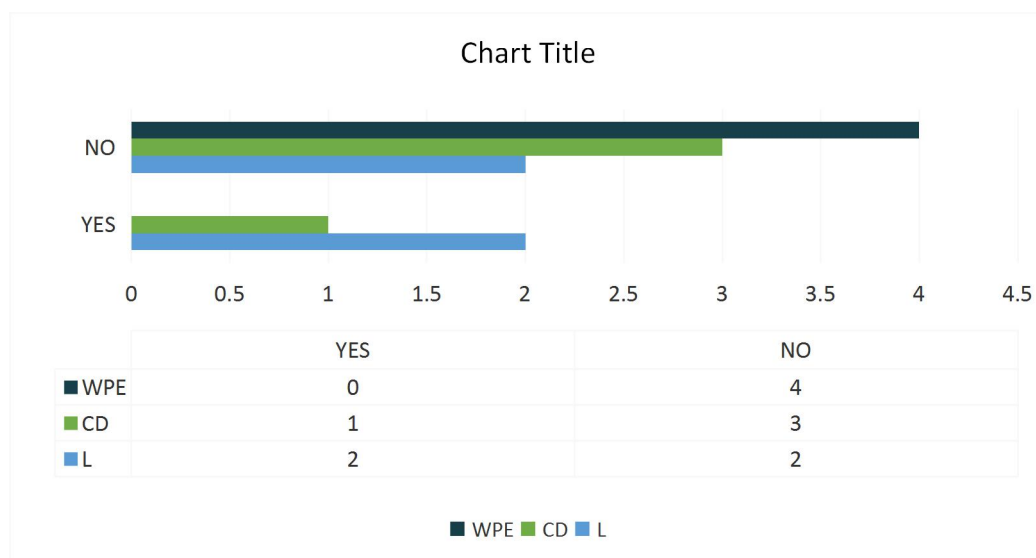


Figure 5: Overall perceptions on productivity of learners upon completion of NQF Level 4 training

In summary, within the L's group; 50% respondents suggested that learners were not adequately prepared; according to the CD's; 75% said that they were not adequately prepared and 100% of the WPE's agreed that they were not adequately prepared for the workplace.

The emerging pattern from these results is that the majority of the groups regard the NQF Learnership Level 4 graduates as not being productive in the workplace upon completion of the programme. It is particularly noteworthy that all workplace employers conceded that they were unproductive. This seems to underline the notion made by Gewer (2010) who claims that employers are reluctant to work with colleges, and do not have faith in the college's ability to produce quality graduates. The results as well as the sentiments echoed by Gewer are unpacked by qualitative data in this study and allude to ineffective and/or non-existent consultation processes between the stakeholders when the curriculum was designed as well as workplace employers lack of knowledge regarding the NQF Learnership Level 4 Curriculum.

4.2.2. Participants values attached to skills and knowledge

In order to identify possible gaps between the curriculum and workplace expectations in terms of skills and knowledge, the Top 10 Qualities of a Great Welder (Weldingschools.com. (2018), were examined. Participants were asked to rank the skills and knowledge areas they deemed important for a welder either from a lecturing point of view, a curriculum developer perspective as well as a workplace employer perspective. These scores were ranked from 1 – 5.

Quantitative data gathered from the questionnaires illustrate the following values attached to skills and knowledge deemed important either from a lecturing or curriculum development or a workplace perspective.

1.	An Ability to Read Blueprints
2.	Awareness of Safety Standards
3.	Customer Service Skills
4.	Concentration
5.	Detail-Orientation
6.	Good Eyesight
7.	Knowledge of Metallurgy
8.	Knowledge of Tools and Equipment
9.	Manual Dexterity
10.	Thorough Knowledge of Various Welding Techniques:

Table 7: Skills and knowledge of a good welder

Lecturers

Within the lecturers group, all generally ranked the skills and knowledge between 4 (very well) and 5 (exceptionally well). These findings suggest that lecturers are teaching according to the needs of the workplace.

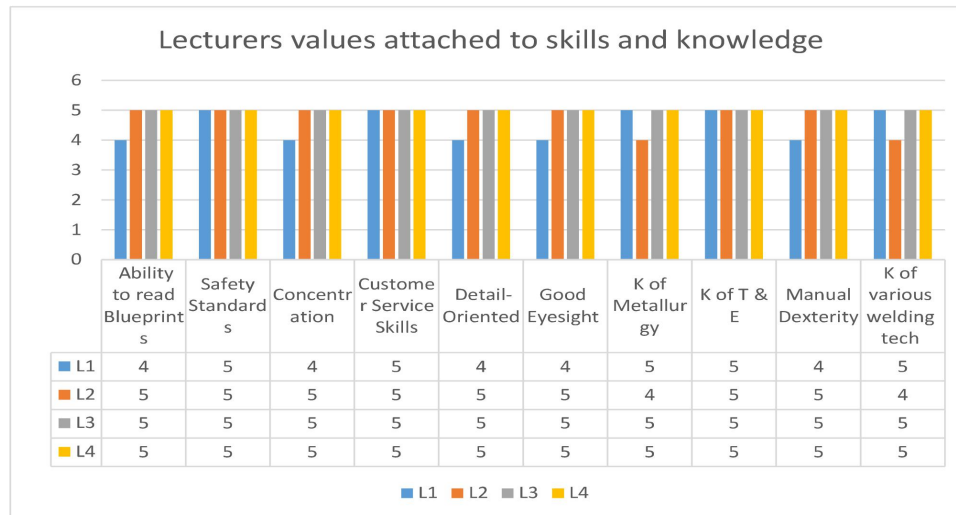


Figure 6: Lecturers values attached to skills and knowledge

Curriculum developers

Curriculum developers, as in the findings with the lecturers, view the skills and knowledge listed as either a 4 (very well) or a 5 (exceptionally well). These scores imply that curriculum developers are au fair with the needs of the workplace and hence the curriculum covers the required skills and knowledge by the workplace.

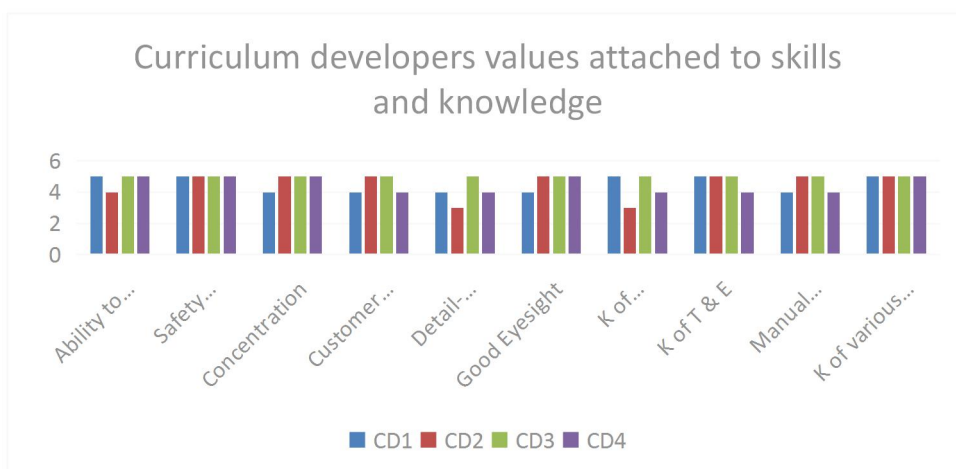


Figure 7: Curriculum developers values attached to skills and knowledge

Workplace employers

Similar to the previous two groups, the workplace employers all attached a rating of 4 (very well) or a 5 (exceptionally well).

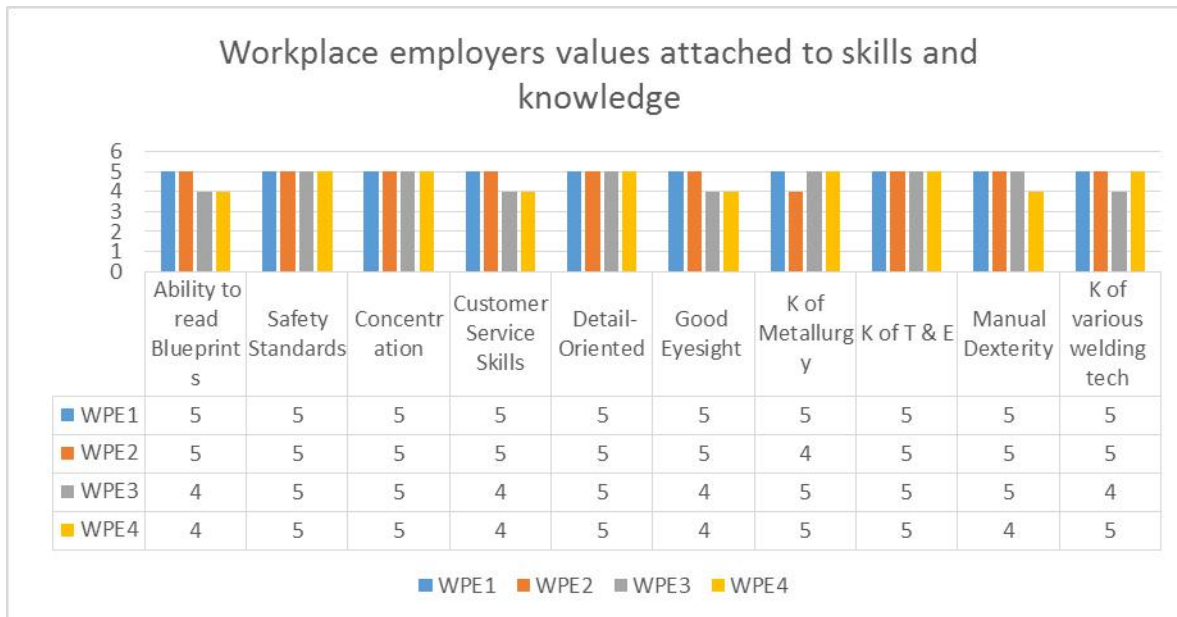


Figure 8: Workplace employers values attached to skills and knowledge

Overall values attached to skills and knowledge

The following graph illustrates a collective ranking of all participants illustrating the values they have attached to skills and knowledge pertaining to welding from their different perspectives.

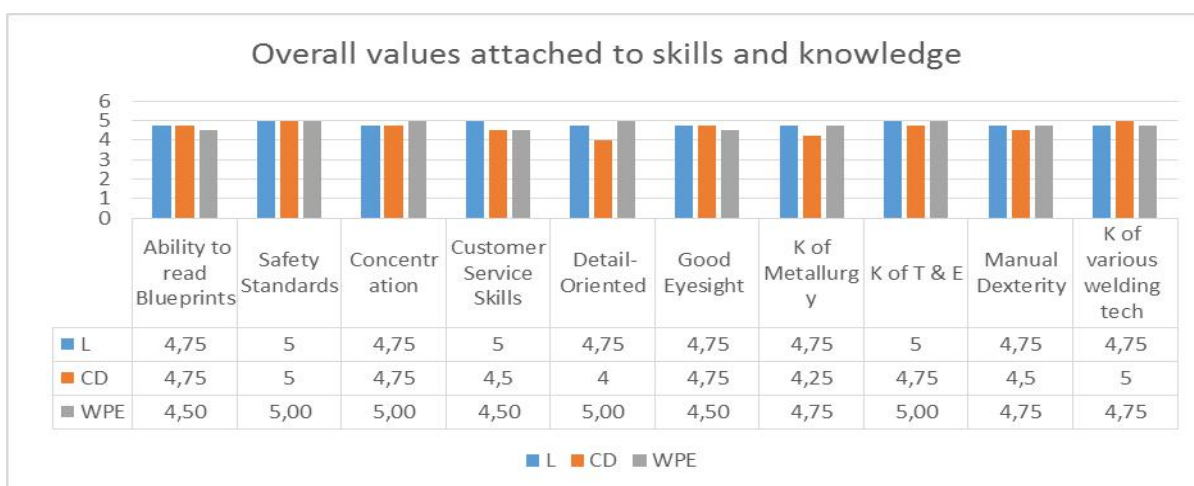


Figure 9: Values attached to skills and knowledge required by a welder

The scale used was as follows:

- 1 - not at all (0 - 20%)
- 2 - very little (20 - 40%)
- 3 - fairly well (40 - 60%)
- 4 - very well (60 - 80%)
- 5 - exceptionally well (80 - 100%)

From the depiction of the above graphs we can deduce that the values attached to skills and knowledge among the three groups ranges between a 4 and 5 - (very well and exceptionally well). Consensus among the group relates to: awareness of safety standards, which forms a critical component in the workplace. The inference can therefore be drawn that learners are being taught what the curriculum advocates by lecturers who hold the same values, and the learners are then placed with workplace employers who hold the same values.

4.2.3 Time allocation

The following data demonstrates the lecturers and curriculum developers understanding of the current time allocation to the three components of the training namely: theory, practical and workplace experience; and the second graph illustrates their suggestions on how time should be spent.

In the present system of technical and vocational education, theoretical learning and some practical skills are obtained in institutions, mostly in the recently renamed TVET colleges, while job specific training occurs through prescribed periods of work placement (Vollenhoven, 2016). It is important to note that the theory and practical as illustrated in this section relates specifically to the content in the unit standard which is taught at an accredited training TVET institution and assessed by accredited assessors.

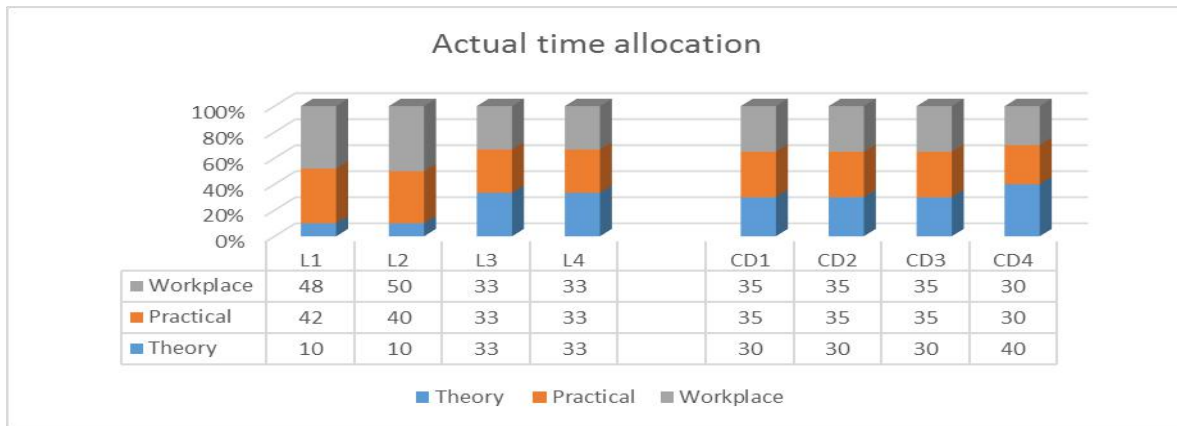


Figure 10: Actual time allocation

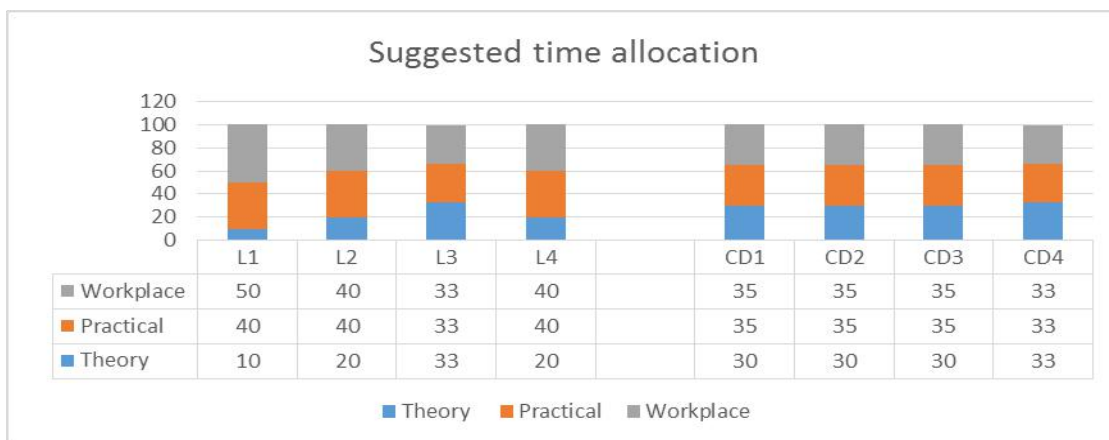


Figure 11: Suggested time allocation

Data on time allocation displays great confusion among the participants. If we examine L1; L3; CD1; CD2; it is apparent that the time allocations suggested does not deviate much from how time is actually spent. It can be speculated that participants are not familiar with the structure of the NQF Learnership Level 4 curriculum in terms of delivery and how to manage both the theoretical and practical aspects.

In the case of L1, theory is much less than practical and he is actually suggesting spending 2% less time on practical's. Interestingly, L3 has not made any changes to the time allocation in spite of claims made that inadequate time allocated for practical's. For CD1 and CD2 there is no deviation between current time and suggested time. This could be interpreted as curriculum developers lacking an understanding of the delivery of the training at the colleges; being under the impression that the actual time allocation for the

delivery of both components is correct and still adhered to at the college; without any challenges on the side of the lecturers.

4.2.4 Experience of lecturers and curriculum developers

Lecturers

Albeit that the curriculum in relation to workplace requirements are under scrutiny, the lecturers experience plays a significant role in the delivery of the curriculum. Knowledge of their experience in the curriculum and the trade helps to unpack the research question; “*What are the skills and knowledge embedded in the NQF Learnership Level 4 curriculum*” and more importantly, provides insight into their perceptions on how the curriculum can meet the needs of the workplace more effectively, should any gaps exist.

Although the lecturers’ qualifications did not form part of the established criteria for this study, it is to be noted that none to the lecturers had been qualified through the NQF Learnership route. The table below indicates the qualifications the identified lecturers hold as well as the institution where it has been obtained.

Lecturer	Qualification	Institution obtained
L1	IIW Welding Specialist Assessor	South African Institute of Welding (SAIW) Merseta
L2	Level 4 Assessor Moderator	Indela Trade Test Centre Merseta Merseta
L3	Coded Welder N4 / Boilermaker Apprenticeship Assessor	Department of Labour Borbyl Offshore Merseta
L4	N3 - Trade Testing Practitioner, Assessor, Moderator Assessor, Moderator	National Artisan Moderation Body (NAMB) Merseta

Table 8: Lecturer qualifications and where obtained

In keeping with the criteria used for selection of participants; all selected lecturers held a minimum of 5 years' experience facilitating the NQF Level 4 qualification which ranged from between 5 and 21 years. This criteria was essential in order to gather meaningful data which could provide insights into the curriculum in reference to the research questions.

The following graph provides an overview of the lecturers' experience lecturing the curriculum and the lecturers' years out of the trade.

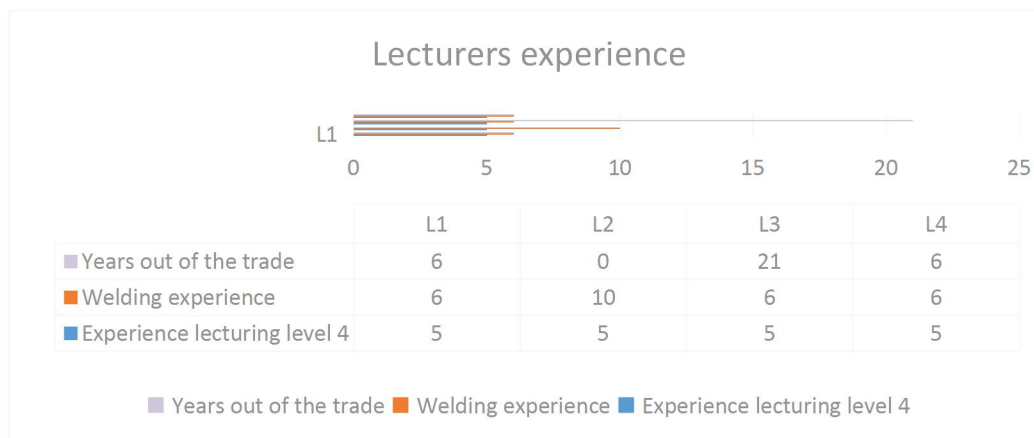


Figure 12: Lecturers experience lecturing the NQF Learnership curriculum & years out of the trade

Two important points relating to the lecturers qualification as well as experience with the qualification is noted. Firstly, none of the lecturers had been trained in the NQF Learnership programme as it is a relatively new qualification; first rolled out in 2001. An assumption is however made that since all artisan welding programmes are composed of both theoretical training and practical training; lecturers would successfully facilitate the programme - provided that the end result, the needs of the workplace, is taken full cognisance of during the facilitation of the programme.

Secondly, while it is important to note that albeit that the participating lecturers were trained through a different route as opposed to the NQF programme, none of them were consulted in the curriculum development process of the said curriculum. This is a grave oversight on the part of the curriculum developers as the lecturers existing welding knowledge acquired through their particular training could possibly have served as a basis

in developing the new NQF curriculum.

Another surprising element which surfaced from the profiling of these lecturers was that L1; L3 and L4 had been outside the welding industry environment for more than five years - and had no contact with the working industry other than lecturing the welding programme. Equally worth noting is that L2 facilitated the learnership but also owned his own welding company and L4 lectured at a private FET college; whilst L1 and L3 lectured at public colleges. These insights become clearer when their views were analysed on the effectiveness of the curriculum. Further, welding experience as employees within the industry varied between participants from 1 year to 34 years; L1 had 1 year experience, L2 had 34 years; L3 had 2 years' experience and L4 had 3 years. It is however important to note that all lecturers interviewed are qualified assessors (through Merseta) and also qualified artisans, therefore complying with the requirements of Merseta to assess the Learnership students.

This information is significant for this study in terms of the correlation between lecturer qualification and knowledge of the actual workplace. Drawing on the data extracted from the interview with L4, great concern was expressed at the prospect of having a lecturer who is not versatile with the welding trade even though they may have qualifications for the job. L4 said, *"You can train someone but them actually doing the job are two different things. The welder is going to build structures - you cannot just give the learner drawings on paper, so the lecturer has to be fully competent as a welder and be familiar with the working environment. And he must not have a lot of years out of the trade, because the industry changes and as a lecturer, if you cannot go back into the field now and do the job, then how can you teach the children to do it? The lecturer must be fully competent, able to do the job, able to go to the company now and do the job that he is teaching".* (See Appendix A, page 9). Similarly, CD3 equally contended in the questionnaire that there are no qualified lecturers to facilitate this programme. He further stated that the lecturer should be a qualified boiler maker or welder with a red seal trade test qualification in order to effectively and practically train these learners.

Based on the above discussion, this study has identified the first gap in terms of the profile

or qualifications of those responsible for NQF welding curriculum delivery. The interviewees are arguing that lecturers should be knowledgeable of workplace skill requirements and be aware of the continuous process of change in the industry. Lecturers need a clear understanding of the necessary skills, knowledge and attitudes a learner needs to acquire in order to be deemed competent as an NQF Level 4 welder; whilst acknowledging the exigency of the employer to respond to workplace demands as a result of both local and global changes. The task of the lecturer will always be juxtaposed between these two needs; the learner and the workplace (Moll, I., Steinberg, C. and Broekmann, I. (2005).

The (DHET, 2016) equally places lecturer competence and ability at the heart of the concerns regarding curriculum implementation. The DHET states that the successful implementation of the NQF curriculum assumes lecturer capacity is in place to deliver in terms of the intended purpose. This however is often not the reality and is evident with regard to the practical training where College staff members have themselves never practiced the trade being taught.

This study concedes that the curriculum is out of control of the lecturer, but advocates that a succinct understanding of the workplace will provide the lecturer with a better context within which to facilitate the curriculum.

Curriculum developers

Curriculum developers identified for this study were specifically related to the National Standard Bodies (NSB's²); the Standard Generating Bodies (SGB's) as well as the relevant Education and Training Quality Assurer (Merseta), as legislated by the SAQA Act 97 of 1998 (Isaacs, 2000). A distinction needs to be drawn at this juncture for purposes of clarity. The functions of SGB's are inter alia to generate qualifications and standards, to update and review standards and to recommend qualifications and standards to NSBs.

² In order to facilitate the process of establishing education and training qualifications and/or standards, National Standards Bodies (NSBs) were established by SAQA. These NSBs form one of SAQA's institutional pillars, with one NSB established per field and registered by SAQA for a period of three years. NSBs are made up of national stakeholders with a key interest in the field. (Isaacs, 2000)

Training providers as well as independent curriculum developers design and develop training material based on these standards and qualifications which have been generated by SGB's and approved by NSB's. Curriculum developers as defined in this research comprised of employees within the curriculum development department within Merseta, a representative from a TVET college and a representative from QCTO who had vast experience in curriculum development and the trade (see Figure 7).

Every three years, all qualifications that are currently registered on the NQF are considered for re-registration. This consideration has been in progress for several months now, as per the decision of the SAQA Board in October 2014 to approve, with certain exceptions, the re-registration of all currently registered qualifications for the period from 1 July 2015 to 30 June 2018 (Isaacs, 2000).

Data findings for the curriculum developers with regards to their experience were as follows:

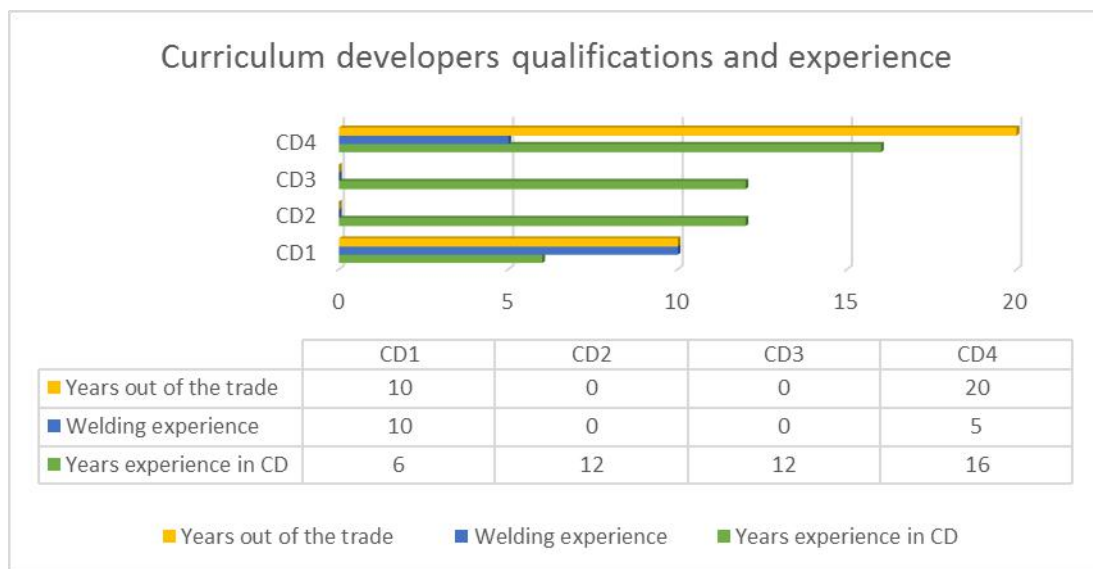


Figure 13: Curriculum developers qualifications and experience

CD1 held 5 to 10 years' experience and in addition worked for 3 years as a welder. CD2 and CD 3 held between 11 to 15 years' experience as curriculum developers. In addition, it was also noteworthy that only two of the curriculum developers had welding work experience. CD1 had last worked in the welding industry 10 years ago for a period of 3

years; CD2 and CD3 had no welding working experience; and CD 4, although he had experience in the field; had been out of the working environment for a number of years and therefore could not say what the industry looks like from a workplace perspective. The assumption that CD's are developing material unaware of neither the needs of the employer nor a clear understanding of the changing nature of the industry, is of concern. The reason being that no consultation exists between the stakeholders (curriculum developers, workplace employers and the lecturers). These findings are presented in the next section.

Workplace Employers

The profiling of the workplace employers revealed the following with regards to their experience with the NQF Learnership Level 4 qualification:

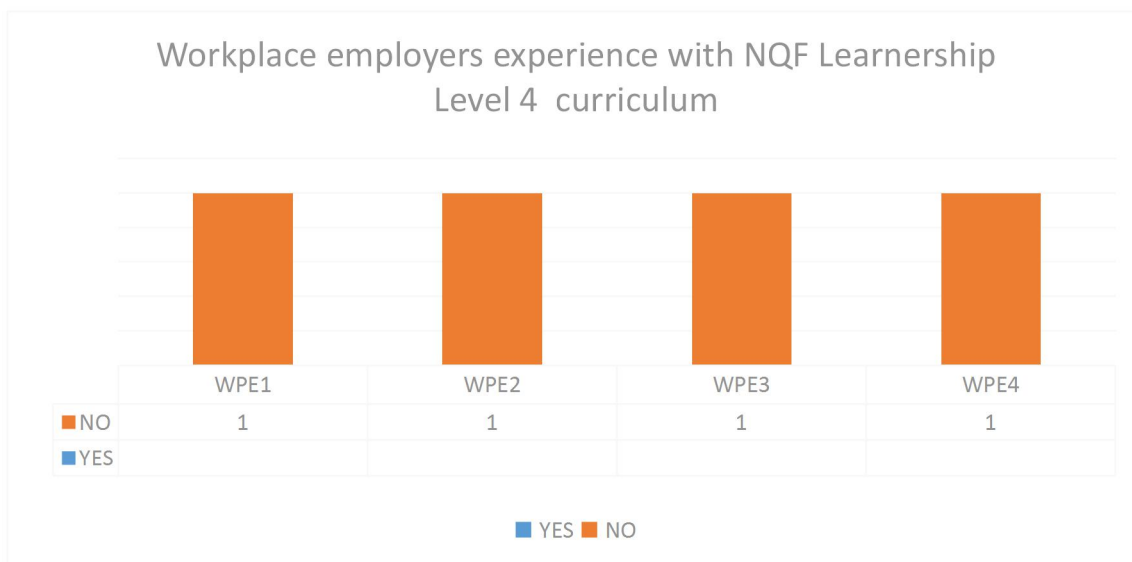


Figure 14: Workplace employers experience with NQF Level 4 Learnership curriculum

Criteria attached to the workplace employers was that they should have employed NQF Learnership Level 4 Welding learners within the past two years, to ensure that cited experiences were recent and relevant. All employers had provided workplace experience for learners during the 2016 period. In addition, they were all owners of their companies and had extensive experience in the trade. 100% of workplace employers agreed that the learners were not productive at the workplace.

4.2.5. Consultation between stakeholders

Curriculum developers

The data retrieved from CD'S as to whether they consulted with workplace employers or lecturers when designing the NQF Learnership Level 4 curriculum reveal the following:

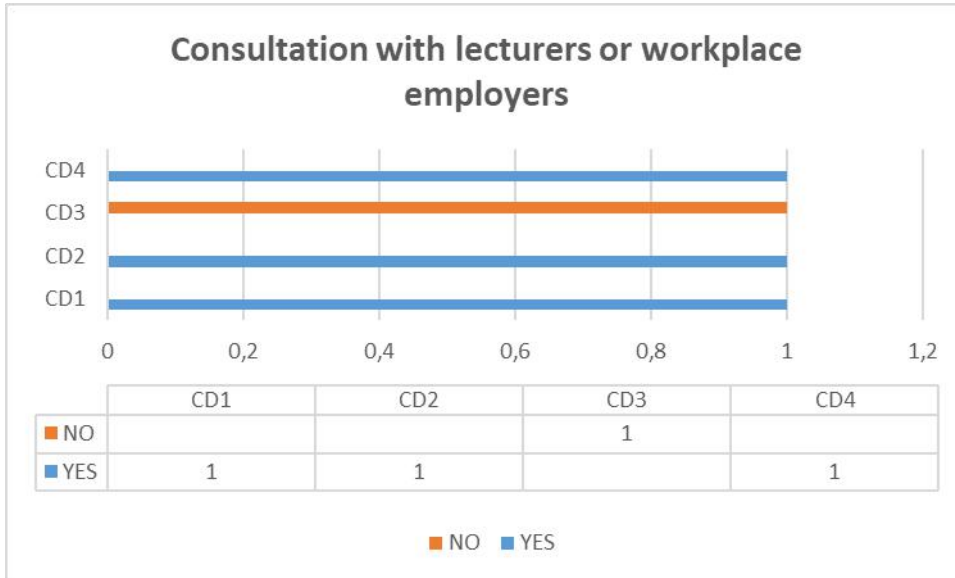


Figure 15: Curriculum developers consultation with lecturers or workplace employers

The quality the TVET curriculum is judged not only by how well the graduates have achieved the programme outcomes, but by “the extent to which a curriculum assists students to enter and succeed in the work place (Finch & Crunkilton, 1999, p. 18 as cited in Albashiry, N. (2015). Considering this, the findings from quantitative data suggest that 75% of CD's do consult with lecturers or workplace employers when designing the NQF Learnership Level 4 curriculum, which is advantageous to ensure the curriculum outcomes is aligned to the needs of the workplace.

Lecturers

The following table depicts responses from the lecturers when probed on whether they ever consult the workplace employers before training the NQF Learnership Level 4 curriculum.



Figure 16: Lecturers consultation with workplace employers

When lecturers were asked if they ever consulted relevant companies in order to establish their expectations before lecturing the curriculum, 50% stated that consultation between the colleges and the workplace does not occur; the other 50% stated that they do consult. A very interesting observation was that L1, and L3 lecture at public colleges and they indicated that consultation does not occur. L4, as indicated earlier, lectures at a private college and since they are dependent on sponsors; are obliged to meet the needs of the client, that is, the workplace. Constant consultation therefore exists between this particular college and the workplace. Reasons for the inconsistencies regarding consultation as well as the implication between the private colleges and the public colleges are discussed under the qualitative data.

Workplace employers

This group's feedback was regarded as the most crucial data as the assumption is that the NQF Learnership Level 4 Curriculum is designed for the end – user in mind, that is, the employer.

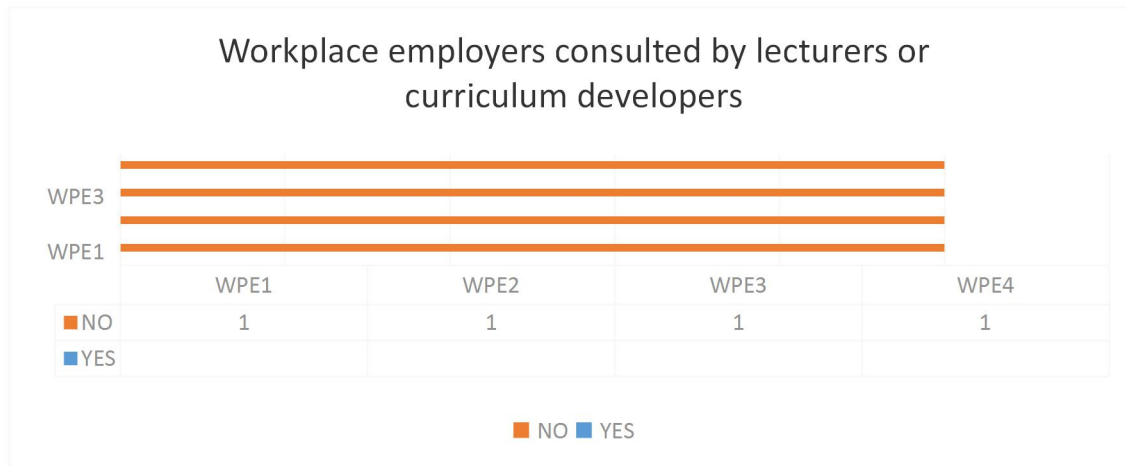


Figure 17: Workplace employers consulted by lecturers or curriculum developers

From a workplace perspective, all employers stated that consultation did not occur. A correlation exists between workplace employers' perceptions of learner's productivity at the workplace and consultation processes. It is interesting to note that all workplace employers deemed learners as not being effective and all also said that consultation did not occur. Qualitative data discussed in 4.3.7 provides insight reasons for lack of consultation as well as implications thereof.

4.2.6 Factors to consider when designing curricula

This question was aimed at understanding the participants' views on factors to consider when designing curricula. Albeit that this data does not provide an understanding of how curricula is currently designed, it is forward looking and provides recommendations on future curricula design.

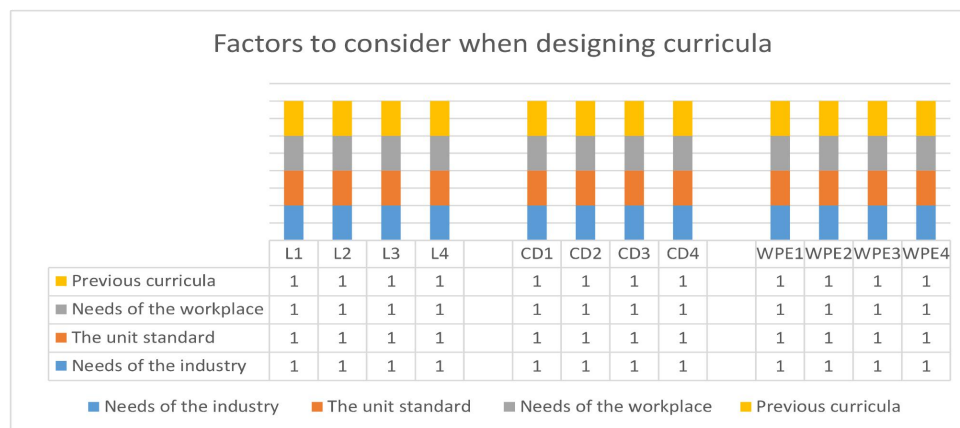


Figure 18: Factors to consider when designing curricula

Data arising from the questionnaires as well as the interview sheets reveal the following:

All participants across the three groups agreed unanimously that all the listed factors should be considered when curricula are designed. The factors are illustrated in the Table below:

#	Factors to consider
1.	Previous curricula
2.	Needs of the workplace
3.	The unit standard
4.	Needs of the industry

Qualitative responses cited by participants clarify this perception. Secondly, all participants attach the same values to skills and knowledge in the curriculum and the workplace, Thirdly, there is minimal deviation between current time allocation and suggested time allocation to both practical and theoretical components of the training. Fourthly, the 75% of the lecturers' were outside of the welding environment for more than 5 years; while the curriculum developers' findings indicate that 50% had no welding experience (CD 2 and CD 3) and CD 1 and CD 4 had been out of the industry for more than 10 years. Finally, in terms of consultation, 75% of CD's indicated that consultation does occur; 50% of lecturers said that consultation does occur, while all workplace employers stated that consultation does not occur.

This concludes the section on quantitative data which has provided us with an opportunity to quantify the perceptions of the participants regarding the NQF Learnership Level 4 curriculum in relation to workplace requirements. The qualitative data which follows will unpack these perceptions and give us a closer view of the issues surrounding the phenomena.

4.3 ANALYSES OF QUALITATIVE DATA

Qualitative data gathered from both the questionnaires and the individual semi-structured interviews provides insight into the reasons behind participants' apparent dissatisfaction with the NQF Learnership Level 4 curriculum. Arising from the claim that insufficient provision has been made for the practical training in comparison to the theoretical training; the following themes have emerged from the data:

-  Ineffective delivery of the curriculum
-  Lack of resources at colleges / simulated work environment
-  lack of qualified and experienced lecturers' / curriculum developers
-  Ineffective consultation among stakeholders

Before analysing these themes, verification of three vital aspects needed to be examined fully so as to refute or accept the claims made by the participants that practical training took precedence over theoretical training. These aspects explored were; the structure of the NQF Learnership Level 4 Curriculum, the values participants placed on skills and knowledge for a welder and their understanding of time allocation within the curriculum with regards to theoretical and practical components.

4.3.1 Claim of lack of practical training

The following qualitative data derived from the questionnaires and interview sheets links to the quantitative data and provides an understanding of why the majority of participants across all three groups view the learners as being unproductive in the workplace upon completion of the NQF Learnership Level 4 training (See Figure 4).

Lecturers

From the lecturers' perspective, L2, who lectures the NQF Learnership Level 4 curriculum and owns a welding company, did not hold the same views as L1 and L3 and stated that the curriculum does not adequately prepare the learners for the workplace. It was interesting to note that both L1 and L3 strongly viewed the curriculum as adequately preparing the graduate for the workplace; both substantiated this view by claiming that

learning takes place (See Appendix 12). Albeit that learning takes place, the question as to what kind of learning and whether it meets the needs of the workplace is debatable. The point I would like to make is that both L2 and L4 have access and insight into the expectations of the workplace - L2 as he owns his own company and is driven by production - and L4 who lectures on a contractual basis at a private college within Gauteng; and is driven by the needs of the sponsors. It is apparent that meeting the needs of the end user is important when accountability is required such as in this instance when sponsors demand a return on investment.

L2 and L4 cited lack of practical skills training within the curriculum to support their view that the NQF Learnership Level 4 curriculum does not adequately prepare the learner for the workplace (See Appendix 1). This is what L4 stated, "*They (the learners) have to get more practical skills training (at the college) as they will be more involved*". One can only fully understand this statement and the merits of this argument when the curriculum is analysed in relation to the theoretical and practical aspects. Findings on this is presented under the *Structure of the curriculum*. The results in this study however illustrates that theory does not take precedence over practical.

Curriculum Developers

From the quantitative findings three of the four participants stated that the NQF Learnership Level 4 curriculum does not prepare learners adequately for workplace.

C1 stated that the curriculum in itself does adequately prepare the learner but that there are challenges with the delivery of the programme (See Appendix 12). This comment implies that the lecturers do not understand the curriculum structure fully in terms of seeking the interrelatedness between on-the-job knowledge and off-the-job knowledge and how the curriculum should be delivered (Moore, 2006). C2 stated that there are gaps between the curriculum and workplace requirements; also that the time allocated to the training programme was too short for the amount of content to be covered. He conceded that knowledge was sufficient (See Appendix 12). C3 cited the lack of qualified lecturers to facilitate this programme and alluded to the importance of lecturers holding the relevant

qualification and experience. This point concurs with the views of L2 and L4 (See Appendix 13). He also stated that knowledge taught outside the context of the workplace is a fruitless exercise and learners needed experience within the welding industry in order to transfer this knowledge in a practical manner. C4 was of the opinion that academically learners were well prepared to be artisans but that the qualification lacks the practical experience. Again, this point supports the views of L2 and L4 (See Appendix 12). He qualified this statement by saying that it does not really prepare them for the trade, but it does prepare them for the world of work where the worker might find himself. He indicated that it was a very broad qualification, but that it does not teach them to be a welder in the true sense. He viewed the qualification as being more about knowledge than doing (See Appendix 15).

Workplace Employers

According to the qualitative data derived from the questionnaires and interview sheet, WPE1 (See Appendix 12) viewed the learners as having adequate practical knowledge, but inadequate practical experience. He stated that the qualification does not provide the learner with adequate practical experience and therefore when they are employed at the companies, they are not productive. WPE 2 (See Appendix 12) criticised the performance of the learners and stated that they were not able to use machinery and tools correctly. WPE 3 (See Appendix 12) similarly stated that learners lack practical skills. According to WPE4 - (See Appendix 12) deemed learners as unproductive or not adequately prepared for the workplace as a result of their inability to work under minimal supervision. This kind of thinking displays the incorrect perception that WPE's have regarding their role in the workplace experience and that is to provide opportunities where their skills can be harnessed; and that the workplace experience forms part of the full qualification. It concurs with the findings regarding the lack of consultation among the three role player's; namely, lecturers, workplace employers and curriculum developers (See Appendix 16).

The consensus among the different groups regarding the lack of *practical skills* is evident in the responses by L2, L4, C4, WPE 1, WPE 2 and WPE 3. Their responses in the above discussion contradicts Carrs (1998) notion of skills and knowledge being *intertwined* in the curriculum and advocacy that the technical curriculum must equip its learners to be highly

competent, skilled practitioners of a particular job, ensuring that all jobs are done well from a technical point of view. Secondly, it must equip its learners with the theoretical knowledge to comprehend change and innovation in the economy and to work flexibly, so that they can be active participants in a modern economy. Equally important is Albashiry, N (2015), who states that the TVET curriculum places emphasis on providing adequate vocational knowledge, and also stresses the provision of hands-on learning experiences, furnishing students with an array of broad skills that would enable them to work independently and adapt to different work environments.

Since this study is concerned with establishing whether the NQF Learnership Level 4 curriculum provides a balance between both the content-based and outcomes-based aspects; it was necessary to verify the contents of the NQF Learnership Level 4 curriculum. The data therefore sought for a connective approach to vocational education and training; meaning that both disciplinary knowledge and job-specific knowledge, thus ensuring that learners are exposed to sufficient as well as relevant knowledge they can apply at the workplace (Young, M. and Jeanne, G. (2006). It also sought to verify the participant's assertions that the curriculum indeed lacked the practical aspect. The structure of the qualification which follows provides insight into this in terms of the composition of skills and knowledge, the time allocation and the delivery of the training programme.

4.3.1.1 Findings on the structure of the qualification

In order to verify claims made by the participants' as well as the reports alluded to regarding the lack of practical training; a document analysis on the following Unit Standard was conducted (See Appendix 8).

- | | |
|----------------------|---|
| 1 US Title: | <i>Further Education and Training Certificate: Welding Application and Practice</i> |
| 2. US ID: | 57887 |
| 3. NQF Level: | 4 |
| 4. Credits: | 158 |

5.Components:

Fundamental Component: Mathematical Literacy = 16 credits

Communication (1st language) = 20 credits

Communication (2nd language) = 20 credits

All Unit Standards in the **Fundamental Component** are compulsory.

The Core Component consists of Unit Standards to the value of **90** credits all of which are compulsory. The Core encompasses those competencies which equips the learner for the occupation. It forms the bulk of the qualification and all outcomes are concerned with the learner's ability to weld, illustrating the practical component of the curriculum.

The Elective Component consists of Unit Standards in a number of specialisations each with its own set of Unit Standards. Learners are to choose a specialisation area and Elective Unit Standards at least to the value of 12 credits which are also practical in nature.

In light of the above, it can be deduced that adequate provision has been made for practical training within the qualification and in fact, practical training makes up the bulk of the credits - 102 credits while the theoretical component makes up 58 credits.

Notwithstanding the larger allocation of practical training in relation to the theoretical training; the workplace experience has been included so as to afford the learner an opportunity to practically apply the core and the electives. They are required to produce evidence of practical application in the form of a log book, which the allocated supervisor in the workplace signs off, followed by the verification of the log books by a Merseta quality assurer. Given these measures to ensure the practical aspect is covered, it is my view that the curriculum has been designed with sufficient structure for the learners to succeed in terms of theory and practical and workplace exposure. It is an important aspect because it is my view that artisans need practical training before they enter the workplace where their tasks will entail working with their hands.

4.3.1.2 Values and skills deemed important

Drawing on the quantitative data discussed in 4.2.2; it has been established that all participants have attached similar values to the skills and knowledge components of the curriculum (a rating of 4 – very well or 5 – exceptionally well - across all areas) (See Figure 9). L1 stated that the curriculum makes provision for important skills such as safety; which he scored a 5. It is worthy to note that curriculum developers and workplace employers' all rated this area a 5 as well. In addition, L1 added skills such as hand-eye co-ordination, reading, comprehension, interpretation, welding as being very important. Once again, if we compare these areas to the curriculum developers' and workplace employers' responses; they are all equally high ranked. The response particularly of CD1 who indicated that the curriculum makes provision for skills such as hand eye co-ordination; content knowledge: health and safety; tools, different types and uses of tools; drawing interpretation; basic calculations is relevant. L3 stated that learners are taught when and where to wear personal protective equipment (ppe); and they are given knowledge on how to do basic welding (gas, arc, etc); and what conditions to work in. This ties in with CD 1 and CD 4 who cited the same skills as being important for the learner. (See Appendix 13). WPE 4 is of similar opinion and has deemed the same skills and knowledge as being important for the learner. Final comments from L4 in this regard is that the curriculum covers all the important knowledge and skills CD2 stated that all the welding skills are covered for NQF Learnership 2,3 and 4 respectively and that knowledge is appropriate to the level and complies with international standards.

The assumption therefore is that learners are being taught what the curriculum advocates by lecturers who hold the same values and the learners are then placed with workplace employers who hold the same values.

4.3.1.3 Time allocation

This study concurs with the argument of Moll, Steinberg and Broekmann (2005) that when there is a “rigid division” between academic (theory) and applied (practical) knowledge; the theory often gets more recognition and learners who do well at more theoretical

studies get more status and better jobs. This does not augur well for learners who are inclined to value skills more and who offer a wide range of technical and practical abilities.

In line with this are the various critiques levelled against the structure of the NQF Learnership Level 4 curriculum in that there is a lack of adequate practical learning in this regard. Lecturers (L1 and L4) claimed that more time was allocated to theory; whilst many of the TVET Colleges claimed that the NQF Learnership Level 4 qualification comprises up to 80% in academic theoretical knowledge with a 10-20% allocation to the practical skill component. Similarly, a report examined within this study, (The Impact Assessment of National Skills Development Strategy II (HSRC (Human Sciences Research Council)), stated that the NQF Level programmes were too theoretical with minimal practical activities. This outcome has implications for the learners' ability to function effectively in the workplace and therefore meet workplace requirements. Data on time allocated to theory and practical aspects within the curriculum was therefore gathered so as to gain an understanding of the structure.

According to the quantitative data displayed in 4.2.3, participants' opinions on the current allocation of time did not differ from their suggested allocation of time. If we examine L1; L3; CD1; CD2; it is apparent that the time allocations, they suggesting does not deviate much from how time is actually spent. Equally interesting is L2; who claimed that there was a lack of practical training within the curriculum yet it is clear that according to the first graph, he is spending more time on practical's and he even suggests allocating an extra 10% to the theory. L4 suggested that 20% should be theory; the remainder should be allocated to practical since the workplace requires practical work to be done. He also indicated that learners do not cope well at the workplace or could not survive as the classroom environment was totally different to the workplace (See Appendix 14).

CD 3 stated that knowledge taught outside the context of the workplace is a fruitless exercise and that learners needed experience within the welding industry in order to transfer this knowledge in a practical manner - and therefore suggested that the entire structure of the curriculum be changed to include 50% workplace experience and therefore proposed a decrease in practical and theoretical time in the classroom so as to

compensate for more workplace experience. These findings concur with L2 who confirmed that all skills are included in the curriculum but that the application is the problem. Although he did not allude to the exact nature of the application which seems to be the problem; but insight can be gained from the comments of L4 (See Appendix 15).

In Bernstein's (2000) terms, CD 3 is actually advocating the principle of de-location (selecting a discourse or part of a discourse from the field of production where new knowledge is constructed) and a principle of re-location of that discourse as a discourse within the recontextualising field (at the workplace). Provided that lecturers are familiar with the work context and are suitably qualified, this principle is conceivable. The results however in this study indicate that the lecturers do not have the necessary knowledge of the changing environment of the workplace, nor the equipment and tools to teach to that context, nor the necessary qualifications.

In summary, the three aspects examined, namely, the structure of the curriculum, the values participants attached to skills and knowledge within the curriculum and their perceptions regarding the actual and suggested allocation of time, all affirm that the challenge does not lie with the curriculum content or structure. Up to this point, the research seems to indicate that the challenge perhaps lies in the delivery of the programme, particularly the practical component.

4.3.2 Themes emerging from the data

4.3.2.1 Ineffective delivery of the curriculum

Bernstein's (2000) theory of recontextualisation is very relevant at this juncture and alludes to the complex relationship between disciplinary knowledge and workplace knowledge within a technical training environment. In light of the establishment that theory has *not* been allocated more time than practical, it became important to examine the delivery of the training programme to understand the reasons participants contend with the theory / practical component of the curriculum.

L4 strongly advocated the need for more practical skills as opposed to theory (See Appendix 15) as welders are concerned with building structures; doing stuff and therefore need to be practically competent. Interestingly, one of the major challenges he alluded to was that the college was not equipped with the necessary machinery equivalent to the workplace (See Appendix 15). He indicated that there was a mismatch between the industry and the classroom; and that was a problem. When asked whether a simulated work environment would make the programme more effective, he responded that since learners needed to dismantle things and put it back together again, without the actual machinery; it was not viable. It was in his view not possible to bring the industry to the classroom, and that was the problem. He further added that when learners are given theory, they must have an understanding of the actual workplace; so when they come back to the college, their minds have been opened; they know what is going on and then they should be given more theory. That was, in his opinion, the way to mould somebody to be a complete better artisan. In tandem with this, are the comments of CD 4. "Training is done in bits and pieces and in the workplace, the learner has to combine all those skills into one, they have to combine all the different types of welding in order to produce the final product". (See Appendix 4).

If we examine the comments of CD1; knowledge is not a problem but rather proper preparation at the college of their practical skills is needed. This statement ties in with the above comments of L4 in that the practical delivery of the programme is a challenge. CD3 equally alluded to learners needing more practical training and suggested them being placed at a workplace during their holidays. This will give them the necessary exposure and at times even employment at the end of their course (See Appendix 15).

C4 concurred with L4 in that firstly, the colleges usually engage in mass training and do not have enough equipment to train in mass so they resort to sharing a training session and this results in some learners taking on the role of observers while others "doers". The second challenge C4 alludes to in the delivery of the programme, is that they (the learners) are not even being trained by artisans (See Appendix 4). The third challenge CD4 alluded

to was that there was no regulation regarding the workplace experience aspect built into the curriculum and that the WPE had no knowledge or experience of what the NQF Learnership Level 4 learner had done in the training. This touches on the theme of lack of consultation between all stakeholders (See Appendix 15).

Concern was expressed by CD 3 that knowledge taught outside the context of the workplace is a fruitless exercise; and that lecturers need experience within the welding industry in order to transfer this knowledge in a practical manner (See Appendix 14). This concern is what Young and Gamble (2006) reference as the vocational curriculum involving two steps in the re-contextualisation of disciplinary knowledge. Relevant for this study in this regard are firstly, whether lecturers are fully qualified, knowledgeable of the industry and equipped to transfer the knowledge component as effectively and practically as possible which matches the workplace context. Secondly, whether learners are provided with an opportunity to practice these newly acquired skills at the college thereby making them proficient in welding procedures and processes when they get to the workplace (Young and Gamble, 2006).

This study takes cognisance of the fact that workplaces generate technological and organisational problems which, given the enormous sectoral diversity, are usually sector-specific but which often transcend the details of particular jobs or particular organisational settings (Barnett 2006). It further recognises that direct observation or what Barnett calls “Sitting by Nellie” is however of little use in acquiring other more abstract knowledges, e.g. types of metals, which may be vital to particular occupations. This concurs with what the participants have discussed regarding the challenges experienced with the delivery of the curriculum.

The intertwining of theory and practical within the curriculum is very important, as but more importantly, according to (Jansen and Hoadley, 2012), is that the curriculum display an overriding emphasis on integration - across disciplines, and between school knowledge and workplace knowledge C4 provides us with an accurate analysis of the importance of integration of knowledge taught at the college and the workplace practical implementation. (See Appendix 15).

4.3.2.2. Participants' experience

This study presupposes that lecturers require a deep conceptualisation of the links between workplace activity and disciplinary knowledge in order to engage in different processes of recontextualisation in which disciplinary knowledge(s) are selectively restructured in reference to the technological or organisational specialised work settings. This study argues that if lecturers are not au fait with the workplace - this recontextualisation process will not occur.

Drawing on quantitative data as illustrated in 4.2.4 (Figure 11; 12 and 13); 75% of the lecturers had been outside the welding industry environment for more than five years and had no contact with the working industry other than lecturing the welding programme. This is in stark opposition to Jansen and Hoadley (2012), who advocate that lecturers require a deep conceptualisation of the links between workplace activity and disciplinary knowledge.

L4 stated the importance of having the lecturer hold both the qualification and relevant workplace experience (See Appendix.15).

CD1 had last worked in the welding industry 10 years ago for a period of 3 years; CD2 and CD3 had no welding working experience; and CD 4, although he had experience in the field; had been out of the working environment for a number of years and therefore could not say what the industry looks like from a workplace perspective.

All workplace employers had employed NQF Level 4 Welding learners within the past two years and 100% of them had absolutely no experience with the NQF Level curriculum.

CD4 stressed the repercussions of workplace employers being ignorant of what the knowledge and skills the learner has acquired during training at the college (See Appendix 5); which often results in the employer viewing the learner as a nuisance in the workplace due to not knowing what the learner can do exactly and where the learner will be most effective. We are reminded of CD4's comment (See Appendix 15) that learners are often not even trained by artisans.

Equally important is the acknowledgment that for recontextualised knowledge to be incorporated into vocational curriculum, a further process of *pedagogic recontextualization*

is required. What this means for this study is that the workplace setting and requirements as well as the lecturers' skills and knowledge as a subject matter expert, need to be taken into cognisance when the curriculum is designed. Providing adequate relevant workplace experiences for learners would greatly enhance opportunities for the learner to integrate some of the theoretical discourse they have been exposed to at the college in a practical manner. It further means that the role of a mentor in the workplace is to guide and support the learner becomes a necessity as the learner responds to the workplace challenges. This is confirmed by Davies and Farquharson (2004) who claim that there exists a lack of technical exposure and insufficient workplace experience within the learnership programme. The practice component is not sufficiently monitored, or theoretical learning may not occur in institutions, but through self-study material. This is a result of guidelines provided by the (Department of Higher Education and Training, 2013), which states that the practical component of study may be offered in a real workplace or in a simulated workplace environment.

Within the context of this study, the factors which make this recontextualisation process ineffective can be ascribed to the lack of qualified lecturers as well as lack of knowledge of changes in the artisan environment.

4.3.2.3. Lack of consultation between stakeholders

C1 stated that consultation did occur and that workplace employers generally cited knowledge as not to be the problem but that learners lacked proper preparation at the college in terms of their practical skills; lack of proper business etiquette and that learners generally displayed bad attitudes toward the workplace. It is however noted that workplace etiquette is not included in the said curriculum (See Appendix 16).

C2 equally stated that consultation occurred and that the input or requests has been specifically related to the practical aspect of the welding and cited examples such as following welding procedures; *following specific methods appropriate to the material to be welded; weld preparation and appropriate welding power source*. It is noted that the unit standard speaks to these requests made by the workplace and it can therefore be

assumed that learners are trained in this regard (See Appendix 16). C3 stated that consultation did not happen and did not provide any reason(s).

The interview with C4 provided greater insight into the consultation process and its shortcomings. He said that consultation did occur but alluded to serious repercussions as a result of ineffective consultation processes between all stakeholders. He stated that consultation with the learner; although not specifically linked to this study, presented two challenges: firstly, that the welder gets the wrong impression of what they get out of this programme as well as the workplace after the training (Appendix 16). By implication, we can assume that money is invested in learners who may possibly not desire a career in this field as a result of lack of information of the trade. Another interesting insight provided by C4 is that the expectation of the workplace is that the welder is expected to perform tasks which he clearly cannot.

These two factors highlighted by CD4 draw our attention to the importance of consultation between stakeholders so as to design and deliver with an end user (workplace) in mind whilst bearing in mind the learner comes with his/ her own unique set of challenges.

Further, he added that although consultation between the workplace employers and curriculum developers did occur; the inputs the Department received was not the right inputs. He alleged that their model of consultation was too open, disorganised and in his opinion, *not the way it should have been done* (See Appendix 16). When probed on what he meant by this assertion, he claimed that the consultants did not understand the industry adequately as they were academics without a tradesman background. They therefore asked all the wrong questions and predictably, they extracted irrelevant answers.

When lecturers were asked if they ever consulted relevant companies in order to establish their expectations before lecturing the curriculum - 50% agreed that consultation between the colleges and the workplace does not occur. The reasons cited for not consulting with the workplace was that it is not common practice; no time - too busy at the college; while another lecturer failed to comment.

A very interesting observation was that L1, and L3 lecture at public colleges and they indicated that consultation does not occur. L4, as indicated earlier, lectures at a private

college and since they are dependent on sponsors; are obliged to meet the needs of the client, the workplace. Constant consultation therefore exists between the college and the workplace (See Appendix 16). Upon further questioning as to the kind of feedback sponsors usually give with regards to performance, L4 stated that workplace employers usually they say that the learners must initially be able to identify stuff, take proper measurements but more importantly - to be able to the job exactly like the other employees who are working there. When asked whether he has to adapt the training material to meet these expectations; he stated that he has to go the extra mile and provide additional training outside the curriculum so as to meet these needs. This statement alerts us to the fact that there exists a gap between the curriculum and workplace expectations.

From a workplace perspective, all employers stated that they had never been consulted on the NQF Learnership Level 4 curriculum and their expectations. Further, WPE4 expressed concern that he was not fully informed what processes and procedures the learnership entailed or what the curriculum contained. He was also not clear on the roles and responsibilities between the three parties; the workplace, the learner and the Seta (See Appendix 16).

WPE2 stated that he was under the impression that his main role was to provide the learner with an opportunity to gain workplace experience. He had no knowledge what skills and knowledge the learner had acquired during training and therefore had no idea what gaps needed to be filled (See Appendix 16). It is however important to note that their qualifications had been obtained via the Nated courses route and they were therefore unfamiliar with the NQF Learnership Level 4 process and requirements. This impacted on their general understanding of the NQF Learnership Level 4 qualification and what the outcomes of this qualification entailed. It is clear that workplace employers are not familiar with the new NQF Level 4 qualification and therefore cannot make an honest assessment of the learners' progress or performance.

Consultation between the Seta and the workplace regarding the entire structure of the programme; the curriculum as well as the purpose of the programme in its entirety, was lacking.

Learners are placed at the workplaces with the aim of acquiring practice in a particular type of welding at a particular level as stipulated in the Level 4 curriculum. In my opinion, there exists a gap which could be investigated further pertaining to sending learners to workplace employers who are familiar with this curriculum and can therefore effectively help skill the learner with reference to the said curriculum.

It has also been documented in this study that in one incident, a suitable workplace mentor or coach was not assigned to the learner and the learner was left to work independently. At the end of the training programme, the learner was not deemed productive in the workplace. It can be speculated that the mentor/coach had not been adequately informed about his roles and responsibilities regarding the development of the learner; or that he lacked the necessary skills and competence to develop the learner (See Appendix 16). Finally, it can be said that the existing employees feel extremely threatened by the presence of younger - soon to be - qualified artisans and are therefore reluctant to assist in helping the learner acquire relevant workplace experience.

4.4 Area of interest: How to close the gap between curriculum outcomes and workplace requirements

4.4.1 Factors to consider when designing curricula

In reference to 4.3.6, figure 17; all participants unanimously agreed that all listed factors, that is, the needs of the industry, the unit standard, the needs of the workplace, and previous curricula must be considered when designing TVET curricula.

In addition to the above factors, L2 stated that the needs of the learner should be included in the development process (See Appendix 17). This concurs with the challenges alluded to by CD that the learners identified for the programme were not suitable in terms of their interests and skills and knowledge.

C1 stated that ideally all stakeholders should be involved in the process of curriculum development, namely, employers, labour, unions, colleges, lecturers, relevant councils

such as Umalusi and QCTO. CD3 added that the improvement of technology in the welding trade should be clearly examined so as to ensure that lecturers and curriculum developers remain abreast of technological changes in the workplace.

4.4.2 Perceptions on how learner could be better prepared for the workplace

Interestingly, all participants alluded to the practical component of the training in response to this question (See Appendix 8). L1 suggested that the practical component be given preference, L2 suggested that the structure of the curriculum allow learners opportunities to apply theoretical knowledge.

C1 suggested that the curriculum should be industry driven and the teaching of practical skills should be emphasized, C2 equally agreed that learners should be provided with more practical training, C3 suggested that learners be placed at workplaces during their holidays so as to gain more practical experience as well as employment opportunities'.

WPE1 stated that there should be more emphasis on application such as practical exposure, WPE 2 added that learners should be allowed to practice what they had been learning during the course and also improve on their attitudes regarding the workplace and develop a more positive attitude. WPE 3 also suggested that learners be given more practical skills when they enter the workplace

The suggestions presented by the three groups generally indicate challenges around the practical component. Albeit that the all participants have only cited the practical skills training as a challenge; this study conclusively indicates that there are other critical factors which need to be considered in the design and development of curricula. These are discussed in the next chapter.

In Summary

The assumption of this research study was that the curriculum does not meet workplace requirements because of the structural design of the curriculum, that is, the practical and theoretical components. In addition, all participants strongly indicated that more practical training was needed and less theory in the training programme. This research has however conclusively refuted this claim and findings suggest that the challenge lies in the actual delivery of the programme and not the structural design of the curriculum.

CHAPTER 5

CONCLUSION

5.1. Introduction

The aim of this research study has been to analyse the NQF Level 4 curriculum in relation to workplace requirements; and to identify gaps if any.

This research study has motivated (Chapter 3; Literature Review) that TVET curricula be based on the *modernist-vocational* theory in order to address the needs of a developmental state (Carr, 1998). This chapter therefore uses TVET curricula pillars as a basis for concluding findings in relation to the NQF curriculum and workplace requirements; with special emphasis on identified gaps. The table provides an overview of these pillars and identified gaps.

Pillar 1	Pillar 2	Pillar 3
Knowledge and skills are strongly intertwined	The need for the constant update of its content and delivery	The curriculum must satisfy the needs of the workplace
No gaps identified	Gap 1: Lecturers are not familiar with the changing environment of the artisan workplace	Gap 4: Lack of synergy between the role players
	Gap 2: Disjuncture between the college and the workplace	
	Gap 3: Lack of resources at colleges	

Table 9: An overview of the gaps identified in relation to proposed theory

5.2. Pillar 1 – Knowledge and skills component

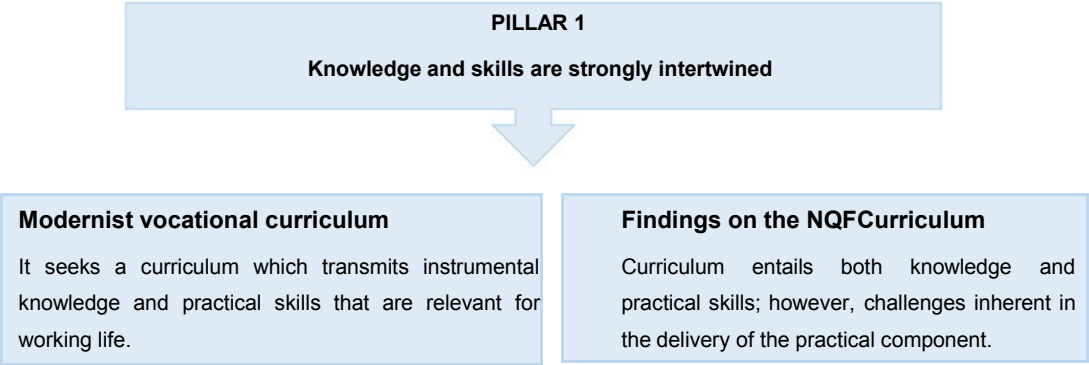


Image 1: Knowledge and skills are strongly intertwined

The NQF Level 4 programme is a contentious issue with previous research findings undertaken generally portraying the curriculum as not meeting the needs of the workplace. Within this study, the majority of the participants regard the learners as not being productive in the workplace upon completion of the training (lecturers – 50%; curriculum developers – 75%; workplace employers – 100%).

The basic premise of this study was the assumption that learners are not exposed in sufficient proportions to practical experience in comparison to the theoretical training; with participants claiming that theoretical training takes up the lion's share of the training programme.

Findings in this study indicate that the NQF curriculum has been designed and developed based on the connective approach to knowledge which encompasses both the knowledge-based and the standards-based approach as advocated by Young & Gamble (2006). These approaches have been discussed in length in Chapter 3 - The Literature Review. Challenges with learners not being productive at the workplace lies with the delivery of the practical component.

5.3. Pillar 2 - The need for the constant update of its content and delivery

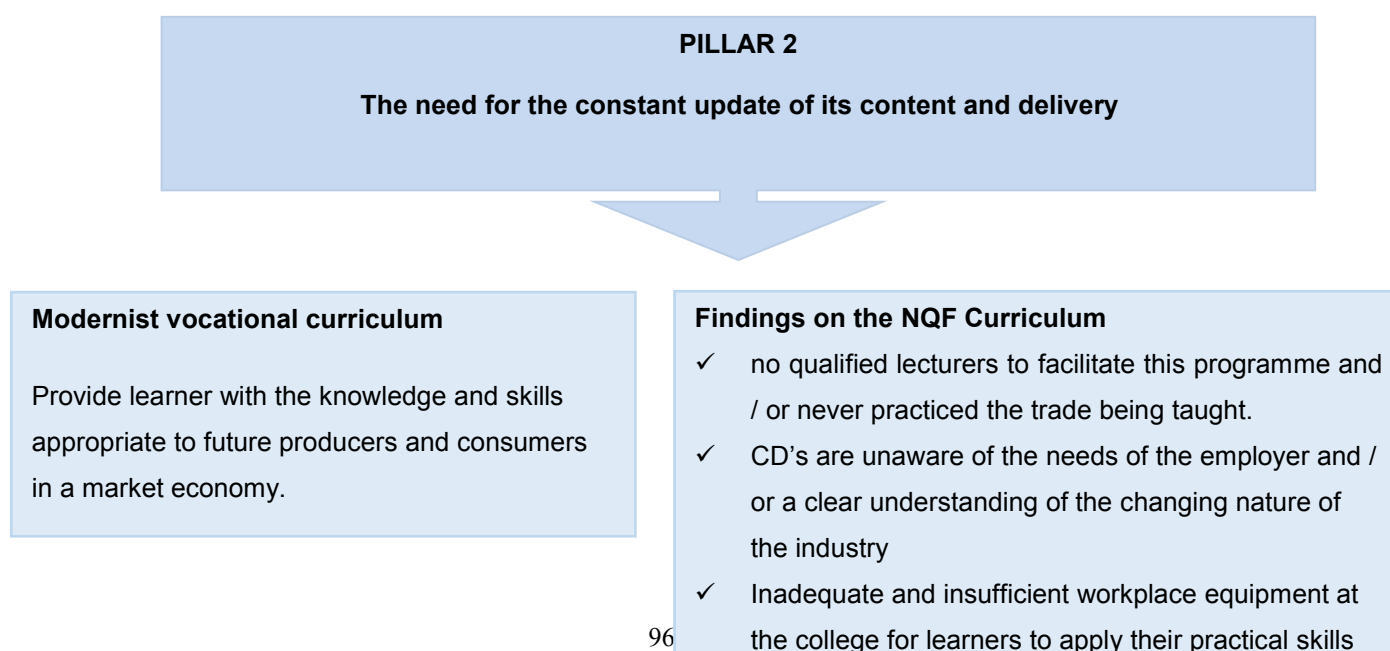


Image 2: The delivery of the curriculum

5.3.1 Gap 1: Lecturers are not familiar with the changing environment of the artisan workplace

This research showed that 75% of the lecturers who participated in the study have been out of the trade for more than 5 years. In addition, only 50% consult with the workplace employer in terms of workplace requirements when training NQF Level 4 students.

Lecturers in this study are not familiar with the changing environment of the workplace and therefore lecture content without the relevant workplace context. Equally, the reality that curriculum developers designed the NQF qualification unaware of the needs of the employer nor a clear understanding of the changing nature of the industry. Workplace employers are not familiar with the new NQF qualification and therefore cannot make an honest assessment of the learners' progress or performance.

5.3.2 Gap 2: Disjuncture between the college and the workplace

Within the TVET system, the college can be viewed as the service provider - providing a service (productive learner) to the end user; which is the workplace. This arrangement therefore necessitates a connection between the two parties in the form of strong partnerships relationships. The South African TVET landscape paints a bleak picture in this regard. Hoffman (2015) asserts that not only have many employers and vocational education specialists claimed that the NQF Level 4 was not adequately aligned to the needs of industry, but that colleges were ill equipped to help students find workplace experience. In spite of the workplace experience being enforced, The Impact Assessment of National Skills Development Strategy II (HSRC (Human Sciences

Research Council), 2012) claims that the qualification does not prepare learners adequately with the skills level required for industry.

5.3.3 Gap 3: Lack of resources at colleges

There is a huge gap between college infrastructure and the workplace environment. The absence of relevant tools and equipment in the college severely hinders the learners' ability to function in the workplace when confronted with the real working environment. Garraway, Joseph., & Wickham (February 2015), concur that not only are procedural instructional methods used by the college out of date, but the tools and equipment and infrastructure between the college and the workplace exhibits a mismatch. The colleges who partook in this study demonstrated an acute lack of practical machinery and equipment which the learners would encounter in the workplace. A simulated work environment and modern technology was also lacking (See Appendix 15).

5.4 PILLAR 3: Curriculum does not satisfy the needs of the workplace

PILLAR 3.
Curriculum must satisfy the needs of the learner as well as societal need, from our South African perspective, economic needs included.

Modernist vocational curriculum

- Aims to reproduce and regenerate the patterns of economic and industrial life
- Supports and envisages a meritocratic society

Findings on the NQF Curriculum

- Learners are not productive in the workplace
- Learners, although qualified, do not meet the needs of business

Image 3: Curriculum does not satisfy the needs of the workplace

Albeit that this study did not include the experiences of the learner in the training of the NQF Level 4 programme and therefore cannot make any definitive comments or present conclusive findings on whether the NQF Level 4 curriculum has made a positive impact on their lives in terms of the above aspirations, the research findings suggest that learners are not productive in the workplace upon completion of the training programme. This assertion does not allow them to compete in a meritocratic society and change their social circumstances for the better.

The findings show that 100% of workplace employers in this study view the learners as not being productive in the workplace (See chap 4, pg 16). In addition, learners, although qualified in the NQF Level 4 programme, do not meet the needs of business (See Chap 4, pg 16). This finding necessitates the need for a review of the delivery of the curriculum.

5.4.1. Gap 4: Lack of synergy between the role players

Insufficient consultation occurred between all identified stakeholders. Curriculum development consultants did not understand the industry adequately and were more academically inclined. Equally, workplace consultation did not occur and employers were not familiar with the NQF curriculum in terms of procedures and processes. They were also not aware of their roles and responsibilities and therefore learners, whilst on their workplace training, were not adequately provided with opportunities to apply their skills and knowledge acquired during their college training. Generally, lecturers at public colleges do not consult with workplace employers and have no prior knowledge on what the expectations are of the workplace nor do they receive any feedback upon completion of the training.

According to Merseta (2008), the employers do not play a significant role in the NQF training programme. This study has revealed that they are not consulted in terms of

curriculum development nor are they briefed about the process of providing workplace experience to the learners or what their roles and responsibilities include.

Another challenge among the role players was that the SETA's have thus far been ineffective in formulating individual relationships with each college which resulted in a loose unstructured system in terms of ensuring by all means that learners are placed at workplaces for their practical experiences since they have a country-wide network of firms and grant levers (Table, 2010).

5.5 Summary

In conclusion, the analyses of the data gathered for research study purposes provides us with a picture of the complexity of ensuring that the NQF curriculum meets the needs of the workplace. Findings in this study illustrates that the challenge with the lack of productivity of the learners in the workplace lies not with the NQF curriculum structure in terms of theoretical and practical components where it was suggested by those in the field and participants in this study. Poor learner performance at the workplace is a combination of factors, symptomatic of a disjointed inefficient education system which underpins it. These factors include: the lack of qualified and/or experienced lecturers to facilitate the programme, curriculum developers are unaware of the needs of the

employer and / or a clear understanding of the nature of the industry; insufficient and inadequate workplace equipment and tools at the college for learners to apply their practical skills; lack of or absence of opportune workplace experiences for learners to gain experience and lack of consultation between all stakeholders

Recommendations are provided in the next chapter on how to deal with the above findings.

CHAPTER 6

RECOMMENDATIONS

6.1 Introduction

This chapter makes recommendations pertaining to the development and implementation of the NQF Level 4 curriculum so as to aid in closing the identified gaps. The aim is to assist all relevant stakeholders in ensuring that learners are productive on the onset of employment.

The recommendations made in this chapter are based on data collected and analysed in the form of questionnaire responses gathered from the three identified stakeholders; as well as from data collected through open ended interviews conducted with one representative of each of the three identified groups. The recommendations are also made using literature where successful TVET artisan programmes are employed such as Germany and Switzerland. The Swiss (has lowest youth unemployment in the world; less than 5%) and the German vocational system are possible models for the delivery of the NQF curriculum which is aimed at responding to the needs of the learner as well as the workplace. Both systems are characterised by a so-called “dual” vocational education and training (VET) system in which students combine learning in school with learning in workplace settings.

6.2 Ensuring lecturers apt response to the changing environment of the artisan workplace

In order to eliminate the occurrence of lecturers not being au fait with the changing environment of the workplace, a quest for personal development and constant artisan training should be instilled in the lecturers. At all times, vocational lecturers should be well prepared. This can be done by exposing them to the workplace on an ongoing basis and relevant training to ensure that they keep abreast of structural and technological changes in the workplace enabling them to adapt their training in the classroom accordingly.

The importance of lecturers being well qualified in the programme as well as familiar with the changes in the workplace is important for ensuring the effective delivery of the curriculum. This will allow them to acknowledge and follow the principles of recontextualisation³. The Department of Higher Education and Training (2013) has recommended that the professional preparation of TVET lecturers be strengthened with attention to balance the pedagogical skills and workplace experience.

6.3 Cohesion between the college and the workplace

The occurrence of workplace employers not playing a significant role in the NQF training programme as well as learners not placed at workplaces for practical experience, can be averted by forging strong partnerships between the colleges and the workplace. Similar to the highly developed Swiss VET system, school and work-based learning should be well integrated. Learners should be provided with hands-on and applied learning opportunities, giving them real work responsibilities with plenty of coaching and adult support (Hoffman, 2015). Learning will become more contextualised, and academic concepts will become made real.

Colleges must become more receptive to employers input into the curriculum to unblock youth unemployment and improve the curriculum.

3 *Re-contextualisation*: disciplinary knowledge(s) are selectively restructured having regard to the technological or organisational problems encountered in specialised work settings (Hoadley & Jonathan, 2009).

It is recommended that *Workplace Based Experience (WBE)* be introduced at all colleges. This refers to a short 5 – 15 day placement in a workplace. The aim is to experience the real world of work in a particular field/profession or industry. The short time is based on what the NQF can accommodate. In this time learners are inducted into the company. The workplace programme may include work observation, job-shadowing as well as real work.



Figure 19: The WIL cycle (Taylor, 2013)

Employers are key to WBE implementation, and colleges must increase their relationships to accommodate the expanding need for placements in the future. They must become more flexible in response to industry and the labour market needs.

6.4 Well-resourced TVET colleges

TVET colleges lack of a simulated work environment and modern technology is in stark contrast to the German VET system which is extremely well-resourced, and combines public and private funding to support the dual system and full-time vocational schools. Equally well-resourced is Switzerland's VET/PET system which is able to include up-to-date equipment where learners are provided with a simulated environment of the workplace (OECD, 2011). The importance of providing learners with state of the art

equipment and technology which they will encounter in the workplace cannot be stressed enough.

Funding should be sourced for our colleges to be better resourced so as to improve the quality of the practical training especially. Strong partnerships with business will provide opportunities for more sponsors to come on board and assist the colleges in terms of resources.

6.5 Synergy between the role players

Symptomatic of our TVET structure is the lack of synergy between relevant stakeholders. For both the German VET system and the Swiss system, employer organisations and associations are the real drivers of the system. Not only are they the ones who decide the training content of VET programmes, for it is their industry standards that must be met, but they also take the lead in determining when new occupational programmes need to be developed to take account of projected changes in the economy, and if existing programmes need to be closed down or radically revised. This is a fundamentally different model than we are accustomed to in South Africa, where it is the responsibility of Quality Council of Trade Occupations and the Seta's to take the lead in the development of vocational programme content, ideally but not with advice from industry.

A TVET model characterised by a definite understanding of the different roles and responsibilities undertaken by all the role players within the vocational education and training system as well as the clear boundaries which exists within the structure is an ideal to be striven for.

Finally, in reference to 4.3.6, figure 17; all participants unanimously agreed that all listed factors, that is, the needs of the industry, the unit standard, the needs of the workplace, and previous curricula must be considered when designing TVET curricula. Ideally all stakeholders should be involved in the process of curriculum development, namely, employers, labour, unions, colleges, lecturers, relevant councils such as

Umalusi and QTCO. In addition, the needs of the learner should be included in the development process (as expressed by L2 -see Appendix 17).

The (Ministerial Task Team, 2006) concede that the role of industry in supporting the WIL engagement should be an inherent component of the social responsibility and culture of industry but this is not the South African ethic: accordingly, the legal implications will need to be investigated and an appropriate legislative framework developed that is conducive to a relationship between the various stakeholders regarding their rights, roles and obligations.

6.6 Conclusion

In conclusion, as envisioned by the Department of Higher Education and Training, (2013), emphasis should be given to strengthening partnerships with employers, both at the system level and that of individual colleges. Such partnerships will assist the college to locate opportunities for work integrated learning, to place students when they complete their studies and to obtain regular workplace exposure for staff so as to keep them abreast of developments in industry. Employers should also be in a position to advise the college system and individual colleges around curriculum, and experts from industry could teach at colleges on a part time or occasional basis. SETA's have an important role to play in promoting and facilitating links between colleges and employers. It is imperative that funding is sought so as to upgrade the resources and facilities at the colleges and make them more in line with the industry. Finally, lecturers should be exposed to the workplace and undergo relevant training on an ongoing basis thus ensuring that they keep abreast of structural and technological changes in the workplace and can adapt their training accordingly.

This study takes cognisance of van Onselen (2008) notion that South in many ways, is a country with first world ambitions, yet constantly hampered by third world realities. We have the largest economy in Africa, but an unemployment rate of 40% and a vast percentage of the population dependent on state assistance, in one form or another. This sentiment is aptly illustrated in the ambition for our TVET system to be modelled around a first world country such as Switzerland in the midst of our socio-economic challenges. Whilst Governments efforts to transform our educational and economic system through the establishment of an effective TVET system, it would be parochial not to acknowledge that the contexts between the two countries is vastly different. The chances of the TVET system making any significant strides in the post-school field is dependent on addressing gaps within the entire TVET system, starting with the identified gaps within this study.



Appendix 1: Ethics clearance

Wits School of Education

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20 September 2016

Student Number: 1247225

Protocol Number: 2016ECE004M

Dear Lynn Wykes

Application for ethics clearance: Master of Education

Thank you very much for your ethics application. The Ethics Committee in Education of the Faculty of Humanities, acting on behalf of the Senate has considered your application for ethics clearance for your proposal entitled:

An analysis of TVET & Community College NQF Level 4 Welding curriculum in relation to workplace requirements

The committee recently met and I am pleased to inform you that **clearance was granted**. However, there were a few small issues which the committee would appreciate you attending to before embarking on your research.

The following comments were made:

☐ Separate interview questions from the questionnaire as these are two separate instruments.

Please use the above protocol number in all correspondence to the relevant research parties (schools, parents, learners etc.) and include it in your research report or project on the title page.

The Protocol Number above should be submitted to the Graduate Studies in Education Committee upon submission of your final research report.

All the best with your research project.

Yours sincerely,

Wits School of Education - 011 717-3416

Cc Supervisor: Dr Thabisile Nkambule/ Ms Mandi Taruvunga

Appendix 1: Questionnaire Workplace Employer

An analysis of TVET NQF Level 4 Learnership Welding Curriculum in relation to workplace requirements:

QUESTIONS

Part A: Biographical Questions – Questionnaire for Workplace Employer

1. What is your designation? e.g. CEO, Line Manager

2. What qualifications do you hold in the welding industry?

3. How many years' experience do you have in the welding industry?

4. How many years have you worked with NQF Level 4 Learnership graduates?

1. 0 to 5 years	2. 6 to 10 years	3. 11 to 15 years	4. 16 to 20 years	5. 21 years or more

5. Describe your role in working with NQF Level 4 Learnership graduates?

--

Part B: Analysing NQF Level 4 Learnership Welding Curriculum

1. What skills do you think a newly recruited NQF Level 4 needs in order to be productive in the workplace?

2. What knowledge should a NQF Level 4 graduate have?

2. In your opinion, does the NQF Level 4 curriculum adequately prepare the graduate for the workplace in terms of skills, knowledge and attitudes? Yes / No

5. If yes, please elaborate on what the curriculum helps develop in terms of:

Skills	
Knowledge	

If no, please highlight the gaps which exists between the curriculum and workplace requirements.

Skills	
Knowledge	

6. In the workplace - what level of importance do you attach to the following with regard to the graduates?

Statement	Very NB	NB	Undecided	Slightly NB	Un NB
A professional approach to work : ◆ Following company policy ◆ Being responsible & accountable ◆ Cooperating ◆ Maintaining integrity ◆ Addressing conflict					
Problem-solving skills					
The ability to use their initiative					
Practical job skills					
The ability to work as part of a team					
Computer skills					
The ability to adapt to changes in the workplace					
A positive attitude towards work					
The ability to work with minimal supervision					
Understanding and adapting to the culture of the workplace					

The ability to use current technology in the workplace					
Knowledge of welding processes according to performance standards as set out in the unit standards relating to the qualification (see qualification)					

7. Qualities of a welder: The following are 10 important qualities a welder needs. On a scale of 1 - 5, rate the extent to which you value each quality: The scale is as follows:

- 1 - not at all (0 - 20%)**
- 2 - Very little (0 - 20%)**
- 3 - Fairly well (40 - 60%)**
- 4 - Very well (60 - 80%)**
- 5 - Exceptionally well (80 - 100%)**

#	Quality	Explanation	Rating (1 -5)	Comments
1.	An Ability to Read Blueprints	A great welder is able to read blueprints quickly and easily and understands how the information presented affects a project.		
2.	Awareness of Safety Standards	A great welder understands safety standards of the industry for protection of themselves, others, and the equipment and tools at hand.		
3.	Concentration	A great welder is able to give their attention fully to a project for long periods of time. They are able to remain committed to their work and ensure all aspects are completed correctly		
4.	Detail-Orientation	A great welder is very detail-oriented and when completing a project, is thorough in the work and does not overlook anything that could have larger, unwanted effects		
5.	Good Eyesight	A great welder has sharp vision and is able to see intricate details in a work area.		
6.	Knowledge of Metallurgy	A great welder is very familiar with various types of metals, their physical properties, and how to work with them.		
7.	Knowledge of Tools and Equipment	A great welder is experienced with a variety of welding tools and equipment. They know how to most effectively use the tools to get the job done quickly in a safe manner.		

8.	Manual Dexterity	A great welder has excellent manual dexterity and good hand-eye coordination to perform the complicated physical maneuvers required of a welding career.		
9.	Thorough Knowledge of Various Welding Techniques:	A great welder has a thorough knowledge of different techniques, such as metal art, oxy-fuel, flux core arc, and gas tungsten arc welding.		
10.	Awareness of Safety Standards	A great welder understands safety standards of the industry for protection of themselves, others, and the equipment and tools at hand.		

Literature: The Welding School (The Welding School, 2012)

8. In your opinion, how can students can be better prepared for the workplace during their NQF Level 4 training?

9. Have you ever examined the NQF Level 4 curriculum in order to determine what your prospective employee has acquired during institutional training? Yes / No

10 If yes, what are your observations about the curriculum?

11. Has a curriculum development expert or lecturer ever consulted you (your organisation) in order to find common ground between the curriculum and workplace expectations? Yes / No

12 If yes, please elaborate on your findings or the outcome

13. Is this your first experience with employing NQF Level 4 graduates / students from a community college/FET college?
Yes / No

14. Would you employ similar graduates in the future? Give a reason for your Answer?
Yes / No

15. If YES, please cite reasons why you would.

--

16. If NO, please cite reasons why not.

--

17. Indicate which of the following statements are TRUE or FALSE:

#	Statement	T / F
1.	Community colleges/ FET colleges equip graduates with the relevant skills, knowledge and attributes required by our company	
2.	Graduates are productive upon employment	
3.	Community colleges/ FET colleges deliver high quality black graduates – which enhances employment equity	
4.	There is a definite connection between the training at the college and the requirements at the workplace	
5.	Graduates understand the field of welding?	

Thank you for your feedback.

Appendix 2: Questionnaire Curriculum Developers

An analysis of TVET NQF Level 4 Welding Curriculum in relation to workplace requirements:

QUESTIONS

Part A: Biographical Questions – Questionnaire for Welding Curriculum Experts

1. What is your designation? e.g. curriculum developer

2. Tick the relevant box(es):

I have experience in level 2 welding curriculum development

☐

I have experience in level 3 welding curriculum development

☐

I have experience in level 4 welding curriculum development

☐

3. How many years have you been involved in curriculum development?

1. 0 to 5 years	2. 6 to 10 years	3. 11 to 15 years	4. 16 to 20 years	5. 21 years or more

4. Have you worked in the welding industry? If yes, please provide details: what position did you hold? How many years?

Part B: Analysing NQF Level 4 Welding Curriculum

1. In your opinion, does the NQF NQF Level 4 curriculum adequately prepare the graduate for the workplace in terms of skills, knowledge and attitudes? Yes / No

2. If yes, please elaborate on what the curriculum helps develop in terms of:

Skills	
Knowledge	

If no, please highlight the gaps which exists between the curriculum and workplace requirements.

Skills	
Knowledge	

3. When designing the curriculum – what level of importance do you attach to the following?

Statement	Very / NB	NB	Undecided	Slightly NB	Un NB
A professional approach to work: ◆ Following company policy ◆ Being responsible & accountable ◆ Cooperating ◆ Maintaining integrity ◆ Addressing conflict					
Problem-solving skills					
The ability to use initiative					
Practical job skills					
The ability to work as part of a team					
Computer skills					
The ability to adapt to changes in the workplace					
A positive attitude towards work					
The ability to work with minimal supervision					

Understanding and adapting to the culture of the workplace					
The ability to use current technology in the workplace					
Knowledge of welding processes according to performance standards as set out in the unit standards relating to the qualification (see qualification)					

4. Qualities of a welder: The following are 10 important qualities a welder needs. On a scale of 1 - 5, rate the extent to which the curriculum covers each quality: The scale is as follows:

1 - not at all (0 - 20%)

2 - Very little (0 - 20%)

3 - Fairly well (40 - 60%)

4 - Very well (60 - 80%)

5 - Exceptionally well (80 - 100%)

#	Quality	Explanation	Rating (1 -5)	Comments
1.	An Ability to Read Blueprints	A great welder is able to read blueprints quickly and easily and understands how the information presented affects a project.		
2	Awareness of Safety Standards	A great welder understands safety standards of the industry for protection of themselves, others, and the equipment and tools at hand.		
3	Concentration	A great welder is able to give their attention fully to a project for long periods of time. They are able to remain committed to their work and ensure all aspects are completed correctly		
4.	Detail-Orientation	A great welder is very detail-oriented and when completing a project, is thorough in the work and does not overlook anything that could have larger, unwanted effects		
5.	Good Eyesight	A great welder has sharp vision and is able to see intricate details in a work area.		
6	Knowledge of Metallurgy	A great welder is very familiar with various types of metals, their physical properties, and how to work with them.		
7	Knowledge of Tools	A great welder is experienced with a variety of welding tools and equipment. They know how to most		

	and Equipment	effectively use the tools to get the job done quickly in a safe manner.		
8	Manual Dexterity	A great welder has excellent manual dexterity and good hand-eye coordination to perform the complicated physical maneuvers required of a welding career.		
9	Thorough Knowledge of Various Welding Techniques:	A great welder has a thorough knowledge of different techniques, such as metal art, oxy-fuel, flux core arc, and gas tungsten arc welding.		
10	Awareness of Safety Standards	A great welder understands safety standards of the industry for protection of themselves, others, and the equipment and tools at hand.		

Literature: The Welding School (The Welding School, 2012)

5. Currently how much time – expressed in hours and percentages – is spent on:

	Hours	% of total time
Theory		
Practical		
Workplace		

6. Do you agree with the allocation of time as set out in question 6? If not, what percentages of time do you think should be allocated to the three components:

	Hours	% of total time
Theory		
Practical		
Workplace		

Comments:

7. Have you ever consulted relevant companies in order to establish their expectations before developing NQF NQF Level 4 welding curricula? **Yes / No**

8. If yes, what has been the input?

9. If no, why not?

10. Tick off the factor(s) which informs the design and development of the curriculum?

#	Statement	Tick
1.	The needs of the industry	
2.	The unit standard - NQF Level 4 Welding	
3.	The needs of the workplace	
4.	Previous curricula	
5.	Other – please explain	

11. Do you think learners can be better prepared for the workplace during training of their NQF Level 4 training? **Yes / No**

12. If yes - what measures do you recommend be implemented?

Thank you for your feedback.

Appendix 3: Questionnaire College Lecturer

An analysis of TVET NQF Level 4 Welding Curriculum in relation to workplace requirements:

QUESTIONS

Part A: Biographical Questions – Questionnaire for Welding Curriculum Experts

1. What is your designation? e.g. Lecturer

2. Tick the relevant box(es):

I have experience in level 2 welding lecturing

☐

I have experience in level 3 welding lecturing

☐

I have experience in level 4 welding lecturing

☐

3. How many years have you been involved in lecturing NQF Level 4?

1. 0 to 5 years	2. 6 to 10 years	3. 11 to 15 years	4. 16 to 20 years	5. 21 years or more

4. Have you worked in the welding industry? If yes, please provide details: what position did you hold? How many years?

Part B: Analysing NQF NQF Level 4 Welding Curriculum

1. In your opinion, does the NQF NQF Level 4 curriculum adequately prepare the graduate for the workplace in terms of skills, knowledge and attitudes? Yes / No

2. If yes, please elaborate on what the curriculum develops in terms of:

Skills	
Knowledge	

3. If no, please highlight the gaps which exists between the curriculum and workplace requirements.

Skills	
Knowledge	

4. When lecturing the NQF Level 4 curriculum – what level of importance do you attach to the following?

Statement	Very / NB	NB	Undecided	Slightly NB	Un NB
A professional approach to work: ◆ Following company policy ◆ Being responsible & accountable ◆ Cooperating ◆ Maintaining integrity ◆ Addressing conflict					
Problem-solving skills					
The ability to use initiative					
Practical job skills					
The ability to work as part of a team					
Computer skills					
The ability to adapt to changes in the workplace					
A positive attitude towards work					
The ability to work with minimal supervision					

Understanding and adapting to the culture of the workplace					
The ability to use current technology in the workplace					
Knowledge of welding processes according to performance standards as set out in the unit standards relating to the qualification (see qualification)					

5. Qualities of a welder: The following are 10 important qualities a welder needs. On a scale of 1 - 5, rate the extent to which the curriculum covers each quality: The scale is as follows:

1 - not at all (0 - 20%)

2 - Very little (0 - 20%)

3 - Fairly well (40 - 60%)

4 - Very well (60 - 80%)

5 - Exceptionally well (80 - 100%)

#	Quality	Explanation	Rating (1 -5)	Comments
1	An Ability to Read Blueprints	A great welder is able to read blueprints quickly and easily and understands how the information presented affects a project.		
2	Awareness of Safety Standards	A great welder understands safety standards of the industry for protection of themselves, others, and the equipment and tools at hand.		
3	Concentration	A great welder is able to give their attention fully to a project for long periods of time. They are able to remain committed to their work and ensure all aspects are completed correctly		
4	Detail-Orientation	A great welder is very detail-oriented and when completing a project, is thorough in the work and does not overlook anything that could have larger, unwanted effects		
5	Good Eyesight	A great welder has sharp vision and is able to see intricate details in a work area.		
6	Knowledge of Metallurgy	A great welder is very familiar with various types of metals, their physical properties, and how to work with them.		

7	Knowledge of Tools and Equipment	A great welder is experienced with a variety of welding tools and equipment. They know how to most effectively use the tools to get the job done quickly in a safe manner.		
8	Manual Dexterity	A great welder has excellent manual dexterity and good hand-eye coordination to perform the complicated physical maneuvers required of a welding career.		
9	Thorough Knowledge of Various Welding Techniques:	A great welder has a thorough knowledge of different techniques, such as metal art, oxy-fuel, flux core arc, and gas tungsten arc welding.		
10	Awareness of Safety Standards	A great welder understands safety standards of the industry for protection of themselves, others, and the equipment and tools at hand.		

Literature: The Welding School (The Welding School, 2012)

6. Currently how much time – expressed in hours and percentages – is spent on:

	Hours	% of total time
Theory		
Practical		
Workplace		

7. Do you agree with the allocation of time as set out in question 6? If not, what percentages of time do you think should be allocated to the three components:

	Hours	% of total time
Theory		
Practical		
Workplace		

Comments:

8. Have you ever consulted relevant companies in order to establish their expectations before lecturing the NQF NQF Level 4 welding curriculum? _____

9. If yes, what has been the input?

10. If no, why not?

11. Which factors do you think should inform the design and development of the Curriculum?

#	Statement	Tick
	The needs of the industry	
	The unit standard - NQF NQF Level 4 Welding	
	The needs of the workplace	
	Previous curricula	
	Other – please explain	

12. Do you think learners can be better prepared for the workplace during training of their NQF Level 4 training? Yes / No

13. If yes - what measures do you recommend be implemented?

Thank you for your feedback.

Appendix 4: Interview schedule for lecturers

I would like to thank you for taking the time to meet with me today. My name is Lynn Wykes and I would like to talk to you about your experiences while participating in the NQF Level 4 Welding curriculum. This interview is specifically concerned with the effectiveness of the NQF Level 4 Welding curriculum in meeting the needs of the workplace.

The interview should take less than an hour. I will be taping the session as I do not want to miss any of your comments; I will also be making notes which I will refer to later during my analysis of the collected data. As we are using a tape, please be sure to speak up so that I am able to capture your comments. All responses will be kept confidential and any information you have volunteered included in the research report will not identify you as the respondent. Finally, you have the right not to answer questions which make you feel uncomfortable or which you deem to be irrelevant or insensitive. You are free to end the interview at any time.

Do you have any questions relating to what I have just explained? _____

Are you willing to participate in this interview? _____

1. How is the NQF Level 4 Welding curriculum structured at your college in terms of delivery?

2. Which aspect does the curriculum focus more on? Theory / practical or workplace experience?

3. In your opinion, is the delivery of the NQF Level 4 curriculum effective in meeting the needs of the workplace? _____

4. If no, how can the effectiveness of this qualification be enhanced resulting in productive artisans upon employment at the workplace?

5. How is the effectiveness of the curriculum evaluated?

6. Which aspect of the curriculum do you deem most important? Give reasons for your answer:
Theory / Practical / Workplace experience

7. List any aspects of the curriculum the college consults with relevant stakeholders. Who are these stakeholders?

ASPECT OF THE CURRICULUM	RELEVANT STAKEHOLDER

8. Are these consultations effective? If yes, list the benefits. If no, discuss how they can be implemented or improved?

9. B

ased on your experience, which factors inform curriculum development; particularly the NQF

Level 4 curriculum?

10. What are your greatest challenges pertaining to the delivery of the NQF NQF Level 4 curriculum?

11. Please provide suggestions on how to overcome these challenges?

12. Is there anything more you would like to add?

I'll be analysng the information you and others gave me and submitting a draft report to the organisation in one month. I'll be happy to send you a copy to review at that time, if you are interested.

Thank you for your time

LYNN WYKES – STUDENT NO. 1247225	
WITS UNIVERSITY	

Appendix 5: Interview schedule for workplace employers

I would like to thank you for taking the time to meet with me today. My name is Lynn Wykes and I would like to talk to you about your experiences while participating in the NQF Level 4 Welding curriculum. This interview is specifically concerned with the effectiveness of the NQF Level 4 Welding curriculum in meeting the needs of the workplace.

The interview should take less than an hour. I will be taping the session as I do not want to miss any of your comments; I will also be making notes which I will refer to later during my analysis of the collected data. As we will be using a tape, please be sure to speak up so that I am able to capture your comments. All responses will be kept confidential and any information you have volunteered included in the research report will not identify you as the respondent. Finally, you have the right not to answer questions which make you feel uncomfortable or which you deem to be irrelevant or insensitive. You are free to end the interview at any time.

Do you have any questions relating to what I have just explained? _____

Are you willing to participate in this interview? _____

1. How adequately is the NQF Level 4 artisan prepared for the workplace upon graduation in terms of the following:

Theory	Practical	Work ethics / professionalism

2. If they are not adequately prepared, how, in your opinion, can they be better prepared for the workplace in terms of above components?

Theory	Practical	Work ethics / professionalism

3. How do you measure the effectiveness of the newly appointed graduate?

4. List some of the greatest challenges you experience when employing NQF Level 4 graduates?

5. In your opinion, what are some of the areas they are adequately prepared in?

6. Do you think that your input as a workplace employer into the curriculum will make a difference. If yes, please explain.

7. What recommendations would you make to the design and development of a curriculum relevant for the workplace? If any.

8. Is there anything more you would like to add?

I'll be analysing the information you and others gave me and submitting a draft report to the organisation in one month. I'll be happy to send you a copy to review at that time, if you are interested.

Thank you for your time

LYNN WYKES – STUDENT NO. 1247225
WITS UNIVERSITY

Appendix 6: Interview schedule for curriculum developers

I would like to thank you for taking the time to meet with me today. My name is Lynn Wykes and I would like to talk to you about your experiences while participating in the NQF Level 4 Welding curriculum. This interview is specifically concerned with the effectiveness of the NQF Level 4 Welding curriculum in meeting the needs of the workplace.

The interview should take less than an hour. I will be taping the session as I do not want to miss any of your comments; I will also be making notes which I will refer to later during my analysis of the collected data. As we will be using a tape, please be sure to speak up so that I am able to capture your comments. All responses will be kept confidential and any information you have volunteered included in the research report will not identify you as the respondent. Finally, you have the right not to answer questions which make you feel uncomfortable or which you deem to be irrelevant or insensitive. You are free to end the interview at any time.

Do you have any questions relating to what I have just explained? _____

Are you willing to participate in this interview? _____

1. Which factor(s) inform the development of the NQF Level 4 Welding curriculum?

2. Which aspect does the curriculum focus more on? Theory / practical or workplace experience?

3. What do you think are the reason for the structure as cited in question 3?

4. In your opinion, is the delivery of the NQF NQF Level 4 curriculum effective in meeting the needs of the workplace? Yes / No?

5. If no, what changes need to be made to the curriculum?

6. Does your organisation have mechanisms on how to test the effectiveness of the curriculum? If yes, please explain?

7. List any aspects of the curriculum your organisation consults with when designing curricula. Who are these stakeholders?

ASPECT OF THE CURRICULUM	RELEVANT STAKEHOLDER

8. Are these consultations effective? If yes, list the benefits. If no, discuss how they can be implemented or improved?

9. Based on your experience, which factors inform curriculum development; particularly the NQF Level 4 curriculum?

10 What are your greatest challenges pertaining to the development of the NQF Level 4 curriculum?

11 Please provide suggestions on how to overcome these challenges?

12. Is there anything more you would like to add?

I'll be analysing the information you and others gave me and submitting a draft report to the organisation in one month. I'll be happy to send you a copy to review at that time, if you are interested.

Thank you for your time

Appendix 7: Excerpt from US 57887



All qualifications and part qualifications registered on the National Qualifications Framework are public property. Thus the material is reproduced or quoted, the South African Qualifications Authority (SAQA) should be acknowledged as the source.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY REGISTERED QUALIFICATION:

Further Education and Training Certificate: Welding Application and Practice

SAQA QUAL ID		QUALIFICATION TITLE		
57887		Further Education and Training Certificate: Welding Application and Practice		
ORIGINATOR				
SGB Generic Manufacturing, Engineering, Technology				
PRIMARY OR DELEGATED QUALITY ASSURANCE FUNCTIONARY			NQF SUB-FRAMEWORK	
The individual Primary or Delegated Quality Assurance Functionary for each Learning Programme recorded against this qualification is shown in the table at the end of this report.			SFAP - Sub-framework Assignment Pending	
QUALIFICATION TYPE	FIELD		SUBFIELD	
Further Ed and Training Cert	Field 06 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	MINIMUM CREDITS	PRE-2009 NQF LEVEL	NQF LEVEL	QUAL CLASS
Undefined	158	Level 4	NQF Level 04	Regular-Unit Stds Based
REGISTRATION STATUS		SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE
Reregistered		SAQA 06120/18	2018-07-01	2021-06-30
LAST DATE FOR ENROLMENT		LAST DATE FOR ACHIEVEMENT		
2022-06-30		2025-06-30		

In all of the tables in this document, both the pre-2009 NQF Level and the NQF Level is shown. In the text (purpose statements, qualification rules, etc), any references to NQF Levels are to the pre-2009 levels unless specifically stated otherwise.

This qualification replaces:

Qual ID	Qualification Title	Pre-2009 NQF Level	NQF Level	Min Credits	Replacement Status
24216	National Certificate: Welding Application and Practice	Level 4	NQF Level 04	169	Complete

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

The purpose of this Qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to work effectively in the welding industry and to meet the challenges of such an environment.

This Qualification is the last of a progression, which culminates in the use of a range of complex welding methods. The purpose of this Qualification is to develop learners who, after completion, demonstrate the ability to:

- Use and apply a variety of plate and pipe welding processes according to performance standards.
 - Participate in self-directed activity, by complying with welding procedures and maintaining business objectives.
 - Demonstrate leadership through effective interaction and communication with clients, peers and members of supervisory and management levels.
- > Range: Leadership (individual and team); problem solving; technical report writing; exploring options for further learning.

Welding knowledge, technique and reflexive skill play a role in this Qualification.

This Qualification requires that learners apply complex welding practice and theoretical knowledge within the following environments:

- Manufacture and Assembly.
- Chemical Plant Installations.
- Food Processing Plant Installations.
- Mining.
- Building and Construction.

Qualifying learners will also understand:

- Implementation and maintenance of business processes.
- Supervision of work units.
- The writing of technical reports.
- Communication and numeracy skills applicable at this level and appropriate to the work environment.

Rationale:

This is the third Qualification in a learning pathway for learners who want to follow establish a career in welding. The qualification replaces the Further Education and Training Certificate: Welding Application and Practice (NQF Level 4) and the interimly registered qualification: Further Education and Training Certificate: Chemical Welder (NQF Level 4).

The welding industry operates in a competitive and challenging environment. The finished processes have to respond to a wide variety of exacting customer and consumer requirements. In addition, the industry has to respond to international competition and environmental issues.

Welding application and practice require joining and cutting of materials that meet national and international requirements. Welding generally requires the joining of material that is subjected to

considerable stress when in operation and the welding process needs to be consistent and accurate.

This Qualification concludes the series of welding qualifications between NQF Level 2 to NQF Level 4.

There are opportunities for further development and a typical career progression may lead to:

- Quality Assurance, a career path and greater security of employment within the welding industry.

This Qualification enables learners who have gained relevant experience in the workplace to obtain credits through the RPL process. This Qualification also forms the basis for further development in the engineering sector, and in particular, the fabrication and welding industry in general.

LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING

It is assumed that learners are already competent in Communication and Mathematical Literacy at NQF Level 3.

Recognition of Prior Learning:

This qualification can be obtained in part or wholly through the recognition of prior learning.

The learner should be thoroughly briefed on the mechanism to be used and support and guidance should be provided. Care should be taken that the mechanism used provides the learner with an opportunity to demonstrate competence and is not so onerous as to prevent learners from taking up the RPL option towards gaining a Qualification.

Access to the qualification:

Access to this qualification is open. However, it is preferable that learners have completed the National Certificate in Welding Application and Practice: NQF Level 3.

RECOGNISE PREVIOUS LEARNING?

Y

QUALIFICATION RULES

The Qualification consists of a Fundamental, a Core and an Elective Component.

To be awarded the Qualification, learners are required to obtain a minimum of 158 credits as detailed below.

Fundamental component:

The Fundamental Component consists of Unit Standards in:

- Mathematical Literacy at NQF Level 4 to the value of 16 credits.
- Communication at NQF Level 4 in a First South African Language to the value of 20 credits.
- Communication in a Second South African Language at NQF Level 3 to the value of 20 credits.

It is compulsory therefore for learners to do Communication in two different South African languages, one at NQF Level 4 and the other at NQF Level 3.

All Unit Standards in the Fundamental Component are compulsory.

Core component:

The Core Component consists of Unit Standards to the value of 90 credits all of which are compulsory.

Elective component:

The Elective Component consists of Unit Standards in a number of specializations each with its own set of Unit Standards. Learners are to choose a specialization area and Elective Unit Standards at least to the value of 12 credits.

Manufacturing and Engineering (Learning Programme ID 58536):

- 14721: Weld pipe with oxy-acetylene gas process, NQF Level 4, 20 credits.
- 10981: Supervise work unit to achieve work unit objectives (individuals and teams), NQF Level 4, 12 credits.
- 14473: Develop and produce computer aided drawings, NQF Level 4, 4 credits.
- 114194: Demonstrate understanding of regulations codes and drawing office practices for structural steel detailing, NQF Level 4, 7 credits.
- 243070: Programme, use and maintain an industrial robot system, NQF Level 4, 10 credits.
- 243051: Weld steel work pieces, using the plasma arc welding process in all positions, NQF Level 4, 20 credits.
- 243050: Weld pipe within the stainless steel material group, using the gas tungsten arc welding process in all positions, NQF Level 4, 20 credits.
- 243087: Weld pipe within the aluminium material group, using the gas tungsten arc welding process in all positions, NQF Level 4, 20 credits.
- 243060: Weld pipe within the stainless steel material group, using the gas metal arc welding process in all positions, NQF Level 4, 20 credits.
- 243083: Weld pipe within the aluminium material group, using the gas metal arc welding process in all positions, NQF Level 4, 20 credits.
- 243065: Weld carbon steel pipe using the gas metal arc welding process in all positions, NQF Level 4, 20 credits.
- 14497: Identify, interpret and produce working structural steel drawings, NQF Level 4, 8 credits.
- 13254: Contribute to the implementation and maintenance of business processes, NQF Level 4, 10 credits.
- 14698: Cut materials using plasma cutting, NQF Level 4, 4 credits.
- 243088: Weld carbon steel pipe, with combination welding processes using the gas tungsten arc welding and gas metal arc welding, in all positions, NQF Level 4, 8 credits.
- 243085: Weld carbon steel work pieces, using the shielded metal arc and gas tungsten arc combination welding processes, in all positions, NQF Level 4, 8 credits.

Chemical Welding (Learning Programme ID 59180):

Learners must do Unit Standard ID 244089 and must choose additional Elective Unit Standards from the list below to give a minimum of 12 credits for the Elective Component:

- 244089: Understand application of physical chemistry in a processing environment, Level 4, 6 credits
- 13254: Contribute to the implementation and maintenance of business processes, Level 4, 10 credits
- 14698: Cut materials using plasma cutting, Level 4, 4 credits
- 114194: Demonstrate understanding of regulations codes and drawing office practices for structural steel detailing, Level 4, 7 credits
- 14473: Develop and produce computer aided drawings, Level 4, 4 credits
- 14497: Identify, interpret and produce working structural steel drawings, Level 4, 8 credits
- 243070: Programme, use and maintain an industrial robot system, Level 4, 10 credits
- 10981: Supervise work unit to achieve work unit objectives (individuals and teams), Level 4, 12 credits
- 243065: Weld carbon steel pipe using the gas metal arc welding process in all positions, Level 4, 20 credits

- 243088: Weld carbon steel pipe, with combination welding processes using the gas tungsten arc welding and gas metal arc welding, in all positions, Level 4, 8 credits
- 243085: Weld carbon steel workpieces, using the shielded metal arc and gas tungsten arc combination welding processes, in all positions, Level 4, 8 credits
- 14721: Weld pipe with oxy-acetylene gas process, Level 4, 20 credits
- 243083: Weld pipe within the aluminium material group, using the gas metal arc welding process in all positions, Level 4, 20 credits
- 243087: Weld pipe within the aluminium material group, using the gas tungsten arc welding process in all positions, Level 4, 20 credits
- 243060: Weld pipe within the stainless steel material group, using the gas metal arc welding process in all positions, Level 4, 20 credits
- 243050: Weld pipe within the stainless steel material group, using the gas tungsten arc welding process in all positions, Level 4, 20 credits
- 243051: Weld steel workpieces, using the plasma arc welding process in all positions, Level 4, 20 credits

Non-Destructive Testing (Learning Programme ID 66311):

- ID 119232: Conduct magnetic particle inspection, Level 4, 6 credits.
- ID 119235: Conduct dye penetrant testing, Level 3, 4 credits.
- ID 119237: Perform and evaluate liquid penetrant testing, Level 4, 6 credits.
- ID 119243: Conduct ultrasonic testing, Level 4, 8 credits.
- ID 119245: Conduct eddy current testing, Level 4, 8 credits.
- ID 119247: Conduct non-destructive radiographic tests, Level 5, 12 credits.
- ID 119250: Conduct non-destructive eddy current testing, Level 5, 12 credits.
- ID 119252: Conduct non-destructive ultrasonic testing, Level 5, 12 credits.
- ID 119253: Conduct magnetic particle testing, Level 3, 4 credits.
- ID 119239: Conduct radiographic testing, Level 4, 8 credits.

Specialisations for Chemical Plant Installations, Mining, Food Processing Plant Installations, Building and Construction and other relevant engineering environments are being developed and will be added at a later stage.

EXIT LEVEL OUTCOMES

1. Use and apply a variety of plate and pipe welding processes according to performance standards.
2. Participate in self-directed activity, by complying with welding procedures and maintaining business objectives.
3. Demonstrate leadership through effective interaction and communication with clients, peers and members of supervisory and management levels.
> Range: Leadership (individual and team); problem solving; technical report writing; exploring options for further learning.

ASSOCIATED ASSESSMENT CRITERIA

1:

- Pipe welding techniques are applied in all positions and tested in accordance with performance standards.
- Welding processes are applied in accordance with performance standards.
> Range: Welding processes include shielded metal arc welding; gas metal arc welding; gas tungsten arc welding; cored-wire welding and oxy-fuel welding.

- Techniques of welding stainless and aluminium are applied and tested in accordance performance standards.

> Range: Aluminium includes plate.

- Safety practices and procedures are applied within a fabrication and welding context.
- Welding machinery, tools and equipment, are cared for, cleaned and stored according to standard operating procedures.
- Work-pieces are assessed in accordance with performance qualification standards.

2:

- Quality assurance practices applicable to the fabrication and welding industry are monitored and controlled by ensuring compliance to specification procedures.
- Business processes are implemented and maintained, and deviations are critically interrogated and the findings are analysed.
- Preventative and corrective measures are applied in accordance with organisational procedures.

3:

- Relationships with peers, supervisory and management levels are established and leadership is demonstrated by assertive communication and behaviour within the workplace.
- Correct technical information is communicated using written reports.
- Problems are identified and are resolved by implementing corrective action.
- Learning opportunities and preparation requirements are identified and a learning plan is developed.

Integrated assessment:

Integrated assessment during, this qualification provides an opportunity for learners to show they are able to integrate life skills and values achieved across a range of unit standards and contexts, with the added practical orientation gained at this level.

Integrated assessment must evaluate the quality of observable performance as well as the thinking behind the performance.

Some assessment aspects will demand practical demonstration while others may not. In some cases inference will be necessary to determine competence depending on the nature and context within which performance takes place.

Assessors will collect evidence of the learner's competence by:

- Observing the learner at work (both in primary activities as well as other interactions) or by relevant simulations.
- Asking questions and initiating short discussions to test understanding.
- Looking at records and reports.

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner on the approach being taken.

Since this is an intermediate level qualification, it is necessary to ensure that the life skills part of the qualification is also targeted to ensure that while the competence may have been achieved in the skills context, learners are able to apply it in a range of other contexts and for further learning, emphasizing leadership and responsibility. The assessment should also ensure that the Critical Cross-Field Outcomes have been achieved.

INTERNATIONAL COMPARABILITY

International comparability in welding programmes has two divergent categories:

- Comparative education and training content, at a specific levels within the context of the South African National Qualifications Framework (NQF).
- Comparative quality assurance standards for international qualification, certification and licensing.
- Comparative education and training content:

It must be stated from the outset of this statement that reference to international benchmarking for this qualification series, applies only to the education and training content at specific levels between NQF 2, 3 and 4 and its measure of "appropriateness" when compared with welder training programmes internationally.

International benchmarking was done against the contents of the International Welder Qualification as specified and prepared by the International Authorisation Board (IAB Group A, WG A3A; IAB-089-2003/EWF-452-467-480-481 Rev.3 - January 2005; expires 31st December 2007). This benchmarking was done in order to align the education and training content of this Qualification Series: National Certificate in Welding Application and Practice NQF 2 and 3 and Further Education and Training Certificate NQF 4, according to international standards.

The comparison with the training approach advocated by the International Welding Institute (IIW) through its "Bratislava Agreement" is particularly valuable, since they also lead to a European Community (EC) standard for Welding, making the International Welder Diploma equivalent to the European Welder Diploma. Participants in the "Bratislava Agreement" include the South African Institute of Welding (SAIW).

This exercise also included an investigation into the American (USA) Welding Society's (AWS) approach to introductory, intermediate and advanced education and training programmes related to welding.

African countries with manufacturing and engineering infrastructure (including SADC countries) were scanned for applicable qualifications or training programmes, but no relevant qualifications are offered in any of these countries.

Good international comparability, including similar core qualification structures and progressions from NQF Level 2 to NQF Level 3, were found in the Australian, New Zealand, British and Scottish qualifications.

A direct comparison with these international qualifications indicates that the education and training focus of all the qualifications is basically the same. The reference to level descriptors differ, in order to accommodate the NQF and outcomes-based education approach. This qualification series therefore makes an attempt at equating the education and training content of the three international skills levels by creating three distinct South African (NQF) welding qualifications, viz:

- > International fillet welder - National Certificate in Welding Application and Practice NQF 2.
- > International plate welder - National Certificate in Welding Application and Practice NQF 3.
- > International pipe welder - Further Education and Training Certificate in Welding Application and Practice NQF 4.

- Comparative quality assurance standards:

This qualification series differs from the international qualification benchmark, in that it does not require the welded work of learners to be quality assured according to the criteria specified by ISO 9606 (or equivalent) qualification tests. Learners may be found competent in accordance with the assessment criteria of the applicable SAQA-registered unit standard after being quality-assured by the presiding ETQA.

Due to the wide reference list of international standards (Welding Code Specifications), an open range statement has been developed for those learning outcomes which refer to "Inspect the welded workpiece".

Range statement: ".....Welded joints acceptance criteria to be in accordance with national and/or

international welding standards", refers to:

- > American Welding Society (AWS):
 - > AWS D1.1 Structural Welding Code Steel.
 - > AWS D1.2 Structural Welding Code Aluminium.
 - > AWS D1.3 Structural Welding Code Sheet Steel.
 - > AWS D1.4 Structural Welding Code Reinforcing Steel.
 - > AWS D1.5 Bridge Welding Code.
 - > AWS D10.9 Welding Code for Pipe and Tubing.
- > American Society of Mechanical Engineers (ASME)/ASME Section IX Boiler & Pressure Vessel Code.
- > American Petroleum Institute (API)/Standard 1104 for Welding Pipe Lines and Related Facilities.
- > British Standard (BS):
 - > BS 4870 Approval Testing of Welding Procedures.
 - > BS 4871 Approval Testing Of Welders Working To Approved Welding Procedures.
 - > BS 4872 Approval Testing Of Welders When Welding Procedure Approval Is Not Required.
- > International Standard Organization (ISO):
 - > ISO 9606 -1 Approval Testing of Welders - Fusion Welding Part 1: Steel.

This Welding Qualification compares well with the best international qualifications and training programmes offered. The additional operational content incorporated in the qualification will serve to support qualifying learners to make better informed, autonomous decisions within a more expansive timeframe than international learners.

ARTICULATION OPTIONS

The Qualification has been designed and structured so that qualifying learners can move from one engineering context to another. This can be achieved by the appropriate selection of credits in the elective category. Equally, holders of other similar welding Qualifications may be evaluated against this Qualification for the purpose of RPL.

Horizontal articulation:

Horizontal articulation can occur with the following qualifications:

- 22871: Further Education and Training Certificate: Engineering Fabrication (light or heavy).
- 23275: Further Education and Training Certificate: Mechanical Engineering: Fitting.
- 23279: Further Education and Training Certificate: Mechanical Engineering: Machining.
- 23281: Further Education and Training Certificate: Mechanical Engineering: Tooling Manufacture.

Vertical articulation:

Successful learners having attained the Further Education and Training Certificate: Welding Application and Practice, may advance to:

- 49061: National Certificate: Master Craftsmanship (Electrical), NQF Level 5.
- Or:
- 49059: National Diploma: Master Craftsmanship (Electrical), NQF Level 5.

MODERATION OPTIONS

- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with an appropriate Education, Training, Quality Assurance (ETQA) Body or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.
- Any institution offering learning that will enable the achievement of this Qualification must be

accredited as a provider with the relevant ETQA or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

- Moderation of assessment will be overseen by the relevant ETQA or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.
- Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards as well as in the exit level outcomes described in the Qualification.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:

- Appropriate Qualification in the field of welding application and practice at NQF level 5 and a minimum of 2 years experience in the welding industry.
- Registration as an assessor with the relevant ETQA.

REREGISTRATION HISTORY

As per the SAQA Board decision/s at that time, this qualification was Reregistered in 2012; 2015.

NOTES

This qualification replaces qualification 24216, "National Certificate: Welding Application and Practice", Level 4, 169 credits.

This submission is the product of the combined review process of the following qualifications:

- 24216: National Certificate: Welding Application and Practice, NQF Level 4 (SAQA 0151/03 on 03 December 2003).
- 13632: Mechanics: Chemical Welding, NQF Level 4 (Interim-regd.).

UNIT STANDARDS:

	ID	UNIT STANDARD TITLE	PRE-2009 NQF LEVEL	NQF LEVEL	CREDITS
Core	243049	Weld carbon steel pipe using the cored-wire welding process in all positions	Level 4	NQF Level 04	10
Core	243054	Weld carbon steel pipe, using the gas tungsten arc welding process in all positions	Level 4	NQF Level 04	20
Core	243062	Weld carbon steel pipe, using the shielded metal arc welding process in all positions	Level 4	NQF Level 04	20
Core	243059	Weld workpieces in the stainless steel material group, using the gas metal arc welding process in all positions	Level 4	NQF Level 04	10
Core	243089	Weld workpieces within the aluminium material group, using the gas metal arc welding process in all positions	Level 4	NQF Level 04	10
Core	243079	Weld workpieces within the aluminium material group, using the gas tungsten arc welding process in all positions.	Level 4	NQF Level 04	10
Core	243057	Weld workpieces within the stainless steel material group, using the gas tungsten arc welding process in all positions	Level 4	NQF Level 04	10

Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	NQF Level 03	5
Fundamental	119458	Analyse and respond to a variety of literary texts	Level 3	NQF Level 03	5
Fundamental	119466	Interpret a variety of literary texts	Level 3	NQF Level 03	5
Fundamental	119457	Interpret and use information from texts	Level 3	NQF Level 03	5
Fundamental	9015	Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	NQF Level 04	6
Fundamental	119462	Engage in sustained oral/signed communication and evaluate spoken/signed texts	Level 4	NQF Level 04	5
Fundamental	119469	Read/view, analyse and respond to a variety of texts	Level 4	NQF Level 04	5
Fundamental	9016	Represent analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 4	NQF Level 04	4
Fundamental	119471	Use language and communication in occupational learning programmes	Level 4	NQF Level 04	5
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	NQF Level 04	6
Fundamental	119459	Write/present/sign for a wide range of contexts	Level 4	NQF Level 04	5
Elective	119235	Conduct dye penetrant testing	Level 3	NQF Level 03	4
Elective	119253	Conduct magnetic particle testing	Level 3	NQF Level 03	4
Elective	119245	Conduct eddy current testing	Level 4	NQF Level 04	8
Elective	119232	Conduct magnetic particle inspection	Level 4	NQF Level 04	6
Elective	119239	Conduct radiographic testing	Level 4	NQF Level 04	8
Elective	119243	Conduct ultrasonic testing	Level 4	NQF Level 04	8
Elective	13254	Contribute to the implementation and maintenance of business processes	Level 4	NQF Level 04	10
Elective	14698	Cut materials using plasma cutting	Level 4	NQF Level 04	4
Elective	114194	Demonstrate understanding of regulations codes and drawing office practices for structural steel detailing	Level 4	NQF Level 04	7
Elective	14473	Develop and produce computer aided drawings	Level 4	NQF Level 04	4
Elective	14497	Identify, interpret and produce working structural steel drawings	Level 4	NQF Level 04	8
Elective	119237	Perform and evaluate liquid penetrant	Level 4	NQF Level	6

		testing		04	
Elective	243070	Programme, use and maintain an industrial robot system	Level 4	NQF Level 04	10
Elective	10981	Supervise work unit to achieve work unit objectives (individuals and teams)	Level 4	NQF Level 04	12
Elective	244089	Understand applications of Physical Chemistry in a processing environment	Level 4	NQF Level 04	6
Elective	243065	Weld carbon steel pipe using the gas metal arc welding process in all positions	Level 4	NQF Level 04	20
Elective	243088	Weld carbon steel pipe, with combination welding processes using the gas tungsten arc welding and gas metal arc welding, in all positions	Level 4	NQF Level 04	8
Elective	243085	Weld carbon steel workpieces, using the shielded metal arc and gas tungsten arc combination welding processes, in all positions	Level 4	NQF Level 04	8
Elective	14721	Weld pipe with oxy-acetylene gas process	Level 4	NQF Level 04	20
Elective	243083	Weld pipe within the aluminium material group, using the gas metal arc welding process in all positions	Level 4	NQF Level 04	20
Elective	243087	Weld pipe within the aluminium material group, using the gas tungsten arc welding process in all positions	Level 4	NQF Level 04	20
Elective	243060	Weld pipe within the stainless steel material group, using the gas metal arc welding process in all positions	Level 4	NQF Level 04	20
Elective	243050	Weld pipe within the stainless steel material group, using the gas tungsten arc welding process in all positions	Level 4	NQF Level 04	20
Elective	243051	Weld steel workpieces, using the plasma arc welding process in all positions	Level 4	NQF Level 04	20
Elective	119250	Conduct non-destructive eddy current testing	Level 5	Level TBA: Pre-2009 was L5	12
Elective	119247	Conduct non-destructive radiographic tests	Level 5	Level TBA: Pre-2009 was L5	12
Elective	119252	Conduct non-destructive ultrasonic testing	Level 5	Level TBA: Pre-2009 was L5	12

Appendix 8: Qualities of a welder



Welders are called upon to join metal parts together through various procedures to aid in construction, manufacturing, and other areas where metal is involved. To be successful in this highly skilled field, a great welder must have:

1. **An Ability to Read Blueprints:** A great welder is able to read blueprints quickly and easily and understands how the information presented affects a project.
2. **Awareness of Safety Standards:** A great welder understands safety standards of the industry for protection of themselves, others, and the equipment and tools at hand.
3. **Concentration:** A great welder is able to give their attention fully to a project for long periods of time. They are able to remain committed to their work and ensure all aspects are completed correctly.
4. **Customer Service Skills:** A great welder has excellent customer service skills and can meet the needs of clients and work well with other staff.
5. **Detail-Orientation:** A great welder is very detail-oriented and when completing a project, is thorough in the work and does not overlook anything that could have larger, unwanted effects.
6. **Good Eyesight:** A great welder has sharp vision and is able to see intricate details in a work area.
7. **Knowledge of Metallurgy:** A great welder is very familiar with various types of metals, their physical properties, and how to work with them.
8. **Knowledge of Tools and Equipment:** A great welder is experienced with a variety of welding tools and equipment. They know how to most effectively use the tools to get the job done quickly in a safe manner.
9. **Manual Dexterity:** A great welder has excellent manual dexterity and good hand-eye coordination to perform the complicated physical manoeuvres required of a welding career.
10. **Thorough Knowledge of Various Welding Techniques:** A great welder has a thorough knowledge of different techniques, such as metal art, oxy-fuel, flux core arc, and gas tungsten arc welding.

<http://weldingschools.com/resources/top-10-qualities-of-a-great-welder>

Appendix 9: Letter to CEO Merseta requesting permission to conduct research

2/26/2016

Merseta

Cnr 7th Street and Rustenburg Road

Auckland Park, 010 219-3000

Johannesburg

Dear Sir

I have completed the first year of my Masters study at the University of Witwatersrand. My second year entails research on my selected topic which is: *An analysis of TVET NQF Level 4 Learnership Welding curriculum in relation to workplace requirements.*

My study is aimed at establishing whether the welding curriculum meets the requirements of the workplace to ensure that graduates of the programme are productive in the workplace. My study aims finding out if any gaps exist and establish how synergy between the curriculum and workplace requirements can be achieved.

I am therefore seeking your permission to allow me to interview one of your welding curriculum development experts. An interview of this nature will provide me with the necessary information in order to complete my research. I will not be using the name of the curriculum expert so as to ensure anonymity. All information gathered during the interview(s) will be kept confidential. Further, all collected information will be stored safely at the Wits School of Education. It will be destroyed between 3-5 years after I have completed my research project.

I hope my request meets with your favourable approval.

Yours sincerely

Lynn Wykes (Ms)

33A 3rd Avenue

Westdene

071 541 3882

LYNN_FORTUIN@hotmail.com

Appendix 10: Letter requesting permission for Department of Higher Education

DEPARTMENT OF HIGHER EDUCATION

2/26/2016

The Department of Higher Education

Director of Research Department

Dear Sir / Madam

I have completed the first year of my Masters study at the University of Witwatersrand. My second year entails research on my selected topic which is: *An analysis of TVET NQF Level 4 Learnership Welding curriculum in relation to workplace requirements.*

My study is aimed at establishing whether the above-mentioned curriculum meets the requirements of the workplace therefore ensuring that graduates are productive in the workplace from the onset of employment. Should any gaps exist, my study aims at highlighting those gaps and make recommendations in order to seek synergy between the curriculum and workplace requirements.

My request is therefore for permission for me to conduct my research which will entail interviews with relevant curriculum development experts, workplace employers and lecturers. I will not be using the name of any of the above-mentioned persons so as to ensure anonymity. All information gathered during the interview(s) will be kept confidential. Further, all collected information will be stored safely at the Wits School of Education. It will be destroyed between 3-5 years after I have completed my research project.

Hoping the above meets your favourable approval

Yours sincerely

Lynn Wykes (Ms)

33A 3rd Avenue

Westdene, Gauteng

071 541 3882

LYNN_FORTUIN@hotmail.com

Appendix 11: Responses: Reasons for the NQF curriculum meeting / not meeting the needs of the workplace:

Curriculum does not meet the needs of the workplace

- L2 - "There is a lack of practical skills in the training programme".
- L4 - *"They (the learners) have to get more practical skills training (at the college) as they will be more involved"*.
- CD2 - "Gaps between curriculum and workplace requirements - time spent in skills training - too short. Knowledge is sufficient".
- CD3 - "There are no qualified lecturers to facilitate this subject. A qualified lecturer should be a qualified boiler maker or welder with a red seal qualification. The same reasons as above will apply to transfer the proper knowledge to the learner. Experience in the welding industry will assist with knowledge gained".
- CD4 - "I think academically they are well prepared to be artisans but they are not skilled to be assessed for artisans. And I think if they do well they will easily be converted to be an artisan. So if I take someone with an NQF and expose them to our qualification (Occupational Certificate), there is a lot of technical expertise to being an artisan but that is where the NQF qualification lacks the practical experience".
- WPE 1 – "Knowledge yes but practical minimal. They do not understand the workplace and are not productive when they are here".
- WPE 2 – "They are unable to use the machinery and tools".
- WPE 3 – "Learners do not have practical skills".
- WPE 4 – "Learners are unable to work on their own, they should work under minimal supervision".

Curriculum does meet the needs of the workplace

- L1 - "Learning takes place"
- L3 - "The curriculum contains Skills: when and where to wear personal protective equipment (ppe); knowledge: how to do basic welding (gas, arc, etc); what conditions to work in.
- CD1 – "Yes in itself as a curriculum but how it is delivered is a challenge".

Appendix 12: Values attached to skills and knowledge

- L1: "All skills are included especially safety which is very important; hand-eye co-ordination, reading, comprehension, interpretation, welding"
- L3: "The important skills have been included such as: when and where to wear personal protective equipment (ppe); knowledge: how to do basic welding (gas, arc, etc); what conditions to work in. Attitudes: how to work and understand fellow workers".

- L4: "The curriculum covers all the important aspects
- CD1: "Yes, in itself as a curriculum but how it is delivered is the challenge. Skills covers hand eye coordination; content knowledge: health and safety; tools, different types and uses of tools; drawing interpretation; basic calculations".
- CD2: "All the welding skills are covered for NQF Level 2,3 and 4 respectively. Knowledge is appropriate to the level and complies with international standards.
- WPE 1:" Reading drawings with understanding, welding definitions and symbols, identify materials, welding consumables, current settings for different thickness and types of materials".
- WPE 4: "Learners should be able to know different welding skills; they must have welding knowledge. They must also know the different types of material. Safety in the welding environment is very important.

Appendix 13: Time allocation

- L4: "They should have a certain percentage - 20% theory; the rest must be practical because when you get into the workplace - you do not do theory, you work - you sign papers, but that's it - but you do your job all the time".
- (When asked how time is allocated at the college) "Three months' theory and then the workplace and then they get employed or they don't - that's the problem. I had some people crying already because they didn't get on with the people, they couldn't survive in the workplace. This (the workplace) is not a classroom. That is why I want my students to understand what the workplace is like".
- CD3: "Knowledge taught outside the context of the workplace is a fruitless exercise; learners needed experience within the welding industry in order to transfer this knowledge in a practical manner. The programme should be made up of 20% theory; 30% practical at the college and 50% at the workplace. Workplace could be done during holidays".

Appendix 14: Delivery of the programme

L2 - "All skills are included but the application is a problem".

L4 - Concentrate more on practical because at the end of the day you going to work with your hands; you going to be welding; whatever trade you going to be doing with your hands. You going to be assembling if you a fitter - if you a welder you going to be building a structure; doing stuff. You are not going to tell somebody about it; you not going to write a letter - you going to be practically doing it and for you to be able to practically competent; you have to have the experience.

There is not a way for me to do that here. I cannot give them what they need in the workplace here - I do not have machinery to actually do it. They will not be able to dismantle something and put it together again. That you will only find in the industry. You cant bring the industry to the classroom, that's the problem

No, I would prefer them to - when you teach them, they go to the actual workplace they go work there then they come back and you teach them more. Not you teach them something they not so sure about. You explain to them, you show them photos of the machines but when they have hands on experience and you still teach them it's so much better.

No, what I want is for them to have theory but then to have workplace experience, fresh workplace experience - don't give him too much theory, just give him enough to learn and then he goes to the workplace and then he comes back to learn more theory. I would like it to be half, you give them theory, then you give them practical - not practical experience like make this or do this, actually how the industry works, relevant workplace experiences because people do theory theory but they do not know what workplace is all about - the politics in the workplace, the negatives in the workplace, the positives in the workplace

No, what Im saying is that students when they have theory they must have actually know what the actual workplace is like so when they come back they have a better understanding, their minds have been opened; they know what is going on and then you give them the rest of the theory ... and that is how you mould somebody to be a complete better artisan. You can't just give him theory theory theory, but he doesnt really know... but he's doing it just because he must know it, but if you give him the practical in the workplace where he is actually doing the job, he will find - because there is different aspects in the workplace, politics in the workplace, there is different ways to do things procedures and everything like that. He is then living it first hand, he's doing it, so when he comes back to theory he will understand everything with an open mind.

CD1 - Knowledge is not a problem, proper preparation at the college of their practical skills is needed.

CD3 - Learners should be placed at a workplace during their holidays. This will give them the necessary exposure and at times even employment at the end of their course.

CD 4 - Now often when you train, you train in bits and pieces, in the workplace, you have to combine all those skills into one - you have to do a bit of this welding then this type to get the final product

on the table. So you have integrated the learning, but you should also have I would say empathy for the learner and say ok, let's take you through the programme and processes and show how we do things here at the workplace. I think you need to understand the sort of this is a new environment. Induct the learner into the world of work but the first thing is what is in the curriculum and what do I expect of them to doAnd then accuracy I think accuracy absolutely important, especially welding if I weld this, you cannot see how accurate I was just by looking at it - there's certain assessments that I will do as a quality controller to see whether it is very accurate. That is why if your practical training was not put in the training - your accuracy will also be lacking. And I'm just talking about welders now as an example.

I don't think it really prepares them for the trade, it prepares them for the world of work where the worker might find himself, it's a very broad qualification - it does not teach them to be a welder in the true sense. And the qualification is much more about knowledge than doing. Yes, and its mass training - I can't blame any of the colleges but often the colleges don't have enough equipment to train in mass so what they do is they sort of share a training session and some look and some do - and that is not good for an artisan.

Yes, to really enhance their skills - that is the first one. And of then they are not even being trained by artisans.

It's (referring to regulation around workplace experience) not there - it's not well recorded in the qualification, it's sort of left to the employer to do it and if they could do it.... and again remember if I take somebody on NQF Level 2 NQF Welder and send him to the employer, now the employer actually doesn't know what this learner has done. Can I use him for buck welding or what can I use this welder for because it's not very clear? Whereas if you have done all of the qualifications and go to the employer then the employer knows that they must be able to cover all this so which ever jobs I get, I can apply them to the jobs. But here you have to be selective, and I always use the example of the motor mechanic industry where I have been taught everything about motor mechanics, I have been taught everything about the fuel system of a car and I go to work for the employer and the employer says but the brakes of this car is broken, I haven't got the knowledge about that - I haven't been taught about the brakes yet. So what does the employer do with me if I haven't been taught that part - so I'm really a waste - a nuisance for the employer.

- L4: The facilitators / lecturers should be versatile in their trade, they should must actually be able to do the job; not just have the paper for the job, but have the ability to actually do the job knows the ins and out, what is the positive and the negatives, you can train someone but actually doing the job is two different things as a welder you going to have to build structures - you cant just give him drawing on paper, so the lecturer must be fully competent in his job - not just have qualification / paper; experience.

And he must also not have a lot of years out of the trade - because the industry changes and you yourself the lecturer, if you cannot go back in the field now and do the job, then how can you teach the children to do it. So that I think is also a problem. The lecturer must be fully competent, able to do the job, able to go to the company now and do the job that he is teaching.

Appendix 15: Consultation

C2: Consultation did occur. The request from industry was more practical related welding training such as welding procedures; *following specific methods appropriate to the material to be welded; weld preparation and appropriate welding power source.*

C3 Consultation did not happen

C4: They consulted, but they couldn't judge whether that consultation was good so I think in a way the welder gets the wrong impression of what they get out of this and remember there was another expectation out of the NQF. We were going to get the bright students at Grade 9 but who were technically inclines, it did not happen - we got those who couldn't make Grade 9 and we said what happens next, there's only one way for you and that is the college. Yes and I think their model of consultation was too open, it wasn't organised the way I think it should've been organised.

They (referring to curriculum developers) did try - remember the NQF is a very broad programme - the civil and the engineering is but two parts in all the trades - and you can't deal with a trade the same way you deal with a book keeper - it's an entirely different approach. You right in a way that they probably didn't know what they were extracting from these people but it wasn't the first time that industry developed qualification because they were involved in the old SAQA qualifications which were with the SETA's so they werent doing this in a vacuum - the industry should have been aware of what to add

Absolutely (referring to QCTO and new process for developing qualifications) we don't develop a qualification without the workplace being present - it cannot be done. And I think this was the weakness with the NQF personally it was not what the industry required but maybe it was designed by academics and not industry and it becomes very tough to do it.

They consulted, but they couldn't judge whether that consultation was good so I think in a way the welder gets the wrong impression of what they get out of this and remember there was another expectation out of the NQF. We were going to get the bright students at Grade 9 but who were technically inclines, it did not happen - we got those who couldn't make Grade 9 and we said what happens next, there's only one way for you and that is the college

You have to take him (the learner) right from the beginning and you don't know where the gaps are - the gap might be science or the gap might be Mathematics or the gap might be

understanding, you found yourself with people who are just not adequately prepared to get into this world and now you have this graduate expecting him to be able to do things and he can't do it.

- L4: Workplace feedback is important, whatever learners we send to them, they must tell me what their needs are - do they need more of this or more of that
- Sponsors - at the beginning they need the people to identify stuff, to take proper measurements, to be able to do the job exactly right like people who have been working there for a 8 years, they want the students to be similar which is a big problem because you can't have a certain amount of months and these people have 6 or 8 years' experience already.
- What happens is a representative from the workplace talks directly to me, I have his email, we always talk because we always in contact, so that is very important here.
- WPE4: I was not informed about what the learners can do or can't do. I am not familiar with this learnership so I do not know what my role or responsibility is.
- WPE 2: I was just asked to host the learners for workplace experience but because I did not know what the learner was taught at the college, I can't help fill what the learner is missing and I do not have time to teach them. We do not have people to help train the learners, production must go out, so learners are left on their own.

Appendix 16: Factors to consider when designing curricula

- L2: The needs of the learner should be considered.
- C1: Ideally all stakeholders should be involved in the process of curriculum development, such as, employers, labour, unions, colleges, lecturers, relevant councils such as Umalusi and QTCO.
- CD3: The improvement of technology in the welding trade should be clearly examined so that that lecturers and curriculum developers know what the technological changes are in the workplace.

Appendix 17: Suggestions on how learners could be better prepared for the workplace

- L1: Practical must be the most important part of the training
- L2: Learners must be given more opportunities to apply theoretical knowledge.
- C1: The curriculum should be industry driven and the teaching of practical skills should be emphasized,
- C2: Learners should be provided with more practical training
- C3: Learners be placed at workplaces during their holidays so as to gain more practical experience as well as employment opportunities'.

WPE1: There should be more emphasis on application such as practical exposure,

WPE 2: Learners should be allowed to practice what they had been learning during the course and also improve their attitudes regarding the workplace and develop a more positive attitude.

WPE 3: Learners be given more practical skills when they enter the workplace

Appendix 18: Sample of Excel spreadsheet used

	L1	L2	L3	L4	%
Ability to read Blueprints	4	5	5	5	4,75
Safety Standards	5	5	5	5	5
Concentration	4	5	5	5	4,75
Customer Service Skills	5	5	5	5	5
Detail-Oriented	4	5	5	5	4,75
Good Eyesight	4	5	5	5	4,75
K of Metallurgy	5	4	5	5	4,75
K of T & E	5	5	5	5	5
Manual Dexterity	4	5	5	5	4,75
K of various welding tech	5	4	5	5	4,75
	CD1	CD2	CD3	CD4	%
Ability to read Blueprints	5	4	5	5	4,75
Safety Standards	5	5	5	5	5
Concentration	4	5	5	5	4,75
Customer Service Skills	4	5	5	4	4,5
Detail-Oriented	4	3	5	4	4
Good Eyesight	4	5	5	5	4,75
K of Metallurgy	5	3	5	4	4,25
K of T & E	5	5	5	4	4,75
Manual Dexterity	4	5	5	4	4,5
K of various welding tech	5	5	5	5	5
	WPE1	WPE2	WPE3	WPE4	%
Ability to read Blueprints	5	5	4	4	4,5
Safety Standards	5	5	5	5	5
Concentration	5	5	5	5	5
Customer Service Skills	5	5	4	4	4,5
Detail-Oriented	5	5	5	5	5
Good Eyesight	5	5	4	4	4,5
K of Metallurgy	5	4	5	5	4,75
K of T & E	5	5	5	5	5
Manual Dexterity	5	5	5	4	4,75
K of various welding tech	5	5	4	5	4,75

	L	CD	WPE		
Ability to read Blueprints	4,75	4,75	4,50		
Safety Standards	5	5	5,00		
Concentration	4,75	4,75	5,00		
Customer Service Skills	5	4,5	4,50		
Detail-Oriented	4,75	4	5,00		
Good Eyesight	4,75	4,75	4,50		
K of Metallurgy	4,75	4,25	4,75		
K of T & E	5	4,75	5,00		
Manual Dexterity	4,75	4,5	4,75		
K of various welding tech	4,75	5	4,75		

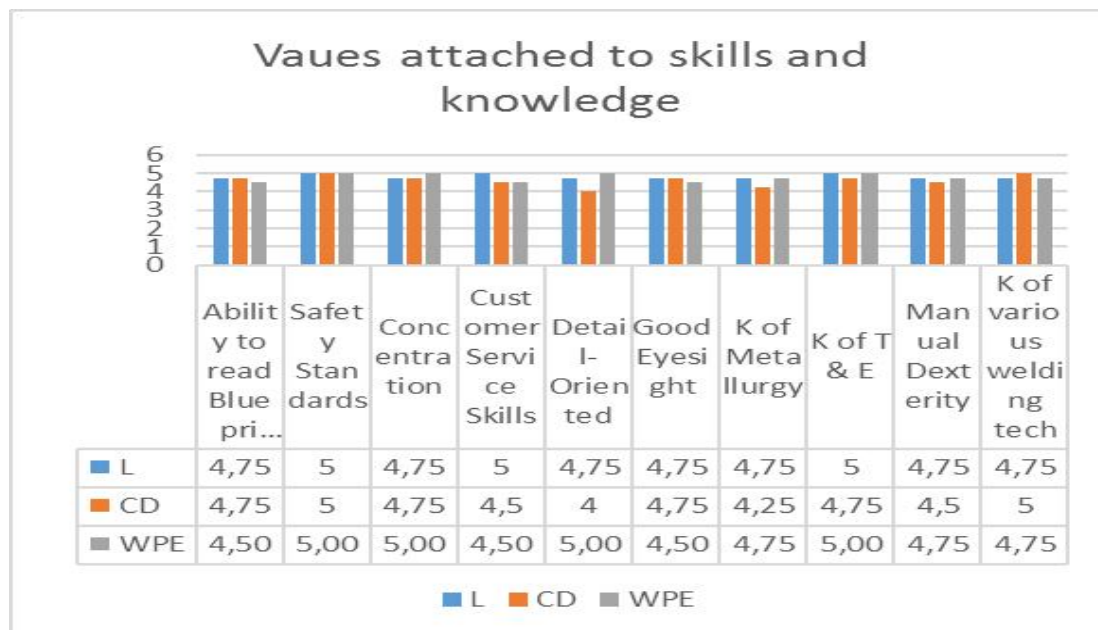


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