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Occupational qualifications: the elusive quest to connect education and work

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Occupational Qualifications: The Elusive Quest to Connect Education and Work

A thesis submitted to the Faculty of Humanities, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Doctor of Philosophy.

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University of the Witwatersrand, 2022

ABSTRACT

This thesis examines the state-led regulatory development of occupational qualifications and their intended curricula under the Occupational Qualifications Sub-Framework of the South African National Qualifications Framework. South Africa's vocational education policy has seemingly shifted from an outcomes-based approach to a more integrated approach to training towards occupational qualifications. The main aim of the research is to analyse the standardised templates for the development of occupational qualifications and their intended curricula, with the view to evaluating whether they contribute to coherent qualification and curriculum development for vocational learning programmes.

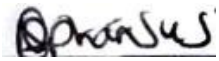
In so doing, the thesis draws on the literature on competency-based training (CBT) and on occupations. CBT prioritises task performance, with learning outcomes derived from standards and subsequently used to design curriculum content. While CBT advocates argue that students are better prepared for work if they can perform the tasks required in the work environment, critics highlight how a focus on task performance-based and assessment-led curricula in vocational education and training fragments learning by excluding disciplinary knowledge. The thesis develops the notion of occupational capacity as the requirement for expert practice, which emphasises that the relationship between training and practice in occupations is subject to two forces: an internal force of specialised knowledge, which encapsulates systematically organised knowledge, occupational practice, skill, and autonomy; and an external force in the form of the social organisation of occupations by professional bodies, institutions, and the state.

The research uses a case-study methodology, thematically analysing the data from interviews, and documents on two occupational qualifications and their intended curricula: electrician and plumber. The analysis shows that occupational qualifications use the CBT approaches of learning outcomes and design down to derive curriculum content that prioritises task performance and compromises specialised knowledge. Additionally, the task performance-focused curriculum content is problematic for fragmenting the systematically organised, specialised knowledge that needs to be developed for expert practice, as a result of the state's distorted version of work readiness (found in standardised templates and development processes) which lacks recognition of the social factors affecting the development of occupational capacity. Ultimately, I argue that vocational education policy seeking to shape occupational training needs to consider both specialised knowledge and the social organisation of occupations to fully engage with the development of occupational capacity for expert practice.

The thesis makes two contributions. first, the research contributes to research uncovering the general principle of competency-based training approaches degrading curriculum. The analysis showed that occupational qualifications and their associated intended curricula relates to occupational standards, which are similar to but somewhat broader than learning outcomes that are designed down into guidance for curriculum content. Second, the research makes a theoretical contribution by strengthening our conceptual understanding of occupations through the development of an occupations conceptual web. In contrast to task-based CBT approaches, the occupations conceptual web centralises occupational capacity based in specialised knowledge and the social organisation of occupations that foregrounds training for expert practice.

DECLARATION

I declare that this research project is my own work, except as indicated in the acknowledgements, the text, and the references, written under the supervision of Prof Stephanie Allais and Prof Yael Shalem. It is being submitted in fulfilment of the requirement for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.



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Naomi S. Alphonsus

_____14_____ day of _____August_____, 2022

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LIST OF ACRONYMS

ANC	African National Congress
CBT	competency-based training
COSATU	Congress of South African Trade Unions
DACUM	Develop a Curriculum (method)
DHET	Department of Higher Education and Training
ILO	International Labour Organisation
IOPSA	Institute of Plumbing of South Africa
IT	information technology
KM	Knowledge Module
KT	Knowledge Theory
NATED	National Accredited Technical Education Diploma
NCV	National Certificate Vocational
NOCC	national occupational curriculum content
NPO	non-profit organisation
NQF	National Qualifications Framework
NVQs	National Vocational Qualifications (UK)
PM	Practical Module
OECD	Organisation for Economic Cooperation and Development
OQSF	Occupational Qualifications Sub-Framework
PRISEC	Private Sector Education Council
QCTO	Quality Council for Trades and Occupations
SANS	South African National Standard
SAQA	South African Qualifications Authority
SETA	Sectoral Education and Training Authority
TVET	technical and vocational education and training
UK	United Kingdom
US	United States
VET	vocational education and training
WM	Work Module

CHAPTER 1 OCCUPATIONAL QUALIFICATIONS IN SOUTH AFRICA: EDUCATION POLICY REFORM OR PRESERVATION?

This thesis is situated amid debates on national vocational education policy, which embody a particular notion of work readiness, based on a certain understanding of how education and work must relate. It focuses on South Africa, where national vocational education policy has seemingly experienced a shift from an outcomes-based approach to a more integrated approach to training towards occupational qualifications. Specifically, I examine the state-led regulatory development of occupational qualifications and their intended curricula under the Occupational Qualifications Sub-Framework (OQSF) of South Africa's National Qualifications Framework (NQF). Combining theoretical insights on competency-based training (CBT) and on occupations, I argue that curricula derived from task-based standardised templates of occupational qualifications do not provide adequate vocational education in terms of preparing students for entry into occupational practice.

In the 1980s, a pronounced change occurred in vocational education, with the move away from traditional training based on content-driven curricula to competency-based training based on task-driven curricula in Anglo-Saxon countries (Harris et al., 1995; Winch, 2011; Wolf, 1989). The development and implementation of CBT approaches had far-reaching effects, which are still in evidence today in the form of regulatory mechanisms such as outcomes-based national qualifications frameworks in several countries—including South Africa (Allais, 2011; Gamble, 2021b; Wheelahan, 2015). The main characteristic of CBT-based education reforms is a focus on task performance to derive the contents of learning programmes (Jessup, 1992; Shalem et al., 2004; Wolf, 2001). Thus, CBT-based national qualifications gave rise to task-based design of qualifications and curricula. They also inspired the creation of national institutions to oversee quality assurance (Allais, 2011; Christie, 1997; Young, 2011). In some places, quality assurance of outcomes-based qualifications has been further used to disseminate the CBT vocabulary of task performance to all areas of vocational education and training (VET) (Allais, 2011; Wheelahan, 2015). However, the introduction of CBT-driven education reforms has also been followed by contentious and continuing debate on the meaning of preparation for work.

Many scholars have critiqued task-driven curricula based on the view that task performance provides a narrow basis for the contents of qualifications and learning programmes. Their work is based on concerns that CBT prioritises task performance at the expense of knowledge (Allais,

2012a; Shalem et al., 2004; Wheelahan, 2015; Wolf, 1989; Young & Gamble, 2006). The knowledge concerns are often addressed through the literatures on occupations and professions, which emphasise that occupational practice draws strongly on bodies of knowledge (Abbott, 1988, 1989; Freidson, 1973, 2001; Standing, 2009; Winch, 2010, 2013, 2014, 2015). Following on from this scholarship, there are two ways in which my research shows that a task-based qualification is insufficient for students in the VET system. First, I use and expand on existing critiques to draw out the similarities between CBT approaches and task-based occupational qualification design in South Africa, and the weaknesses of both. Second, I apply theoretical work on occupations and occupational capacity to analyse the social factors that negatively affect the vocational education system of two specific occupations—plumber and electrician. I argue that in some instances, a task-based approach to occupational qualifications and their intended curricula could further exacerbate the problems experienced in teaching and learning programmes.

A strong theme running through the thesis is that the relationship between training and practice in occupations is subject to two forces. The first is an internal force of specialised knowledge, which encapsulates systematically organised knowledge, occupational practice, skill, and autonomy. This is why I undertake a systematic analysis of the standardised templates of occupational qualifications and their associated intended curricula, which provides insights into the internal force of specialised knowledge. The second force is external and takes the form of the social organisation of occupations by professional bodies, institutions, and the state. This is why I analyse the social factors found in state regulations, workplace conditions, and relationships between employers, professional bodies and educators that can contribute to, or hinder, the development of occupational capacity. Both specialised knowledge and the social organisation of occupations underpin preparation for occupational capacity, which is a requirement for expert practice. This research investigates whether occupational qualifications and their intended curricula address occupational capacity or embody CBT approaches that prioritise task performance.

This chapter introduces the question that lies at the heart of this thesis, as to whether the standardised design form of occupational qualifications under South Africa's current Occupational Qualifications Sub-Framework (OQSF) can lead to a well-designed learning programme of preparation for occupational practice. To that end, it is important to first understand how the current VET system evolved. The chapter chronicles two major education reforms that have taken place in South Africa since the end of apartheid in 1994: one, the introduction and implementation of the National Qualifications Framework; and two, the addition of three sub-frameworks,

including the Occupational Qualifications Sub-Framework, to the NQF. In so doing, the discussion locates the reform of occupational qualifications in South Africa in the wider national and international contexts, focusing on the problems and events that triggered reform.

The early reform process and the development of the NQF reflected the intentions and goals of the post-apartheid democratic government, which sought to address the problems of uneven quality in the education system, slow economic growth, and high unemployment. The subsequent reform, which introduced occupational qualifications, focused on addressing the problems associated with the outcomes-based NQF in particular and CBT approaches in general. These problems related to CBT critics' concerns about knowledge and policymakers' concerns about work readiness (Allais, 2012a; National Qualifications Act, 2008 [Act No. 67 of 2008]: Occupational Qualifications Sub-Framework [OQSF] Policy, 2014; Young & Gamble, 2006). Knowledge concerns with outcomes based qualifications were addressed by the specifying the addition of knowledge modules where the legislation emphasises how occupational qualifications must "consist of two key components, namely knowledge /theory and application" (National Qualifications Act, 2008 [Act No. 67 of 2008] : Revised Occupational Qualifications Sub-Framework, 2020, p. 19). Work readiness concerns were addressed through the introduction of occupational standards which represented "statements of work performance" that captured the ability to apply knowledge and skills and perform functions in an occupation (National Qualifications Act, 2008 [Act No. 67 of 2008] : Revised Occupational Qualifications Sub-Framework, 2020, p. 22). The policy further explains that "occupational standards are a reference point "for the knowledge, practical skills and work experience included in the qualification which supports "lifelong learning employability" (National Qualifications Act: Revised Occupational Qualifications Sub-Framework, 2020, pp. 18, 22).

The chapter begins with a short discussion on the introduction and implementation of the National Qualifications Framework in post-apartheid South Africa. Understanding the NQF is a necessary starting point for understanding the reform of occupational qualifications. Section 1.1 outlines the emergence and implementation of the South African NQF and outcomes-based qualifications alongside the political aspirations of the newly elected democratic government. Section 1.2 reviews the problems experienced with implementing the outcomes-based NQF in South Africa. Section 1.3 is a review of international critiques of outcomes-based reforms of national qualifications frameworks. Section 1.4 explains how the occupational qualifications analysed in this thesis emerged through legislation and regulatory structures in South Africa.

Section 1.5 sets up the research problem and Section 1.9 outlines the research objectives of exploring occupational qualifications and their intended curricula in South Africa in this study.

1.1 South Africa's Outcomes-Based National Qualifications Framework

Education policy in post-apartheid South Africa is inextricably linked to the National Qualifications Framework and its subsequent iterations (Allais, 2011; Christie, 1997; Young & Gamble, 2006). As the democratic transition took hold in South Africa, the period before the first free elections of 1994 saw a lot of research on policy reforms. In education, the goal then, and as it has remained, was to create an integrated system that combines education, training, and certification (Muller, 2004). After 1994, although the post-apartheid democratic government did not formally embrace a policy of competency-based training, the NQF that was introduced in 1995 has an outcomes-based approach with similarities to CBT. The introduction of the NQF was a major reform, and for the purposes of this thesis, it is important to understand the specific way in which it emerged.

The 1995 White Paper for Education was the first key policy document. It combined the three parts of the education system: universities, vocational education colleges, and further education and training colleges. A separate act established the South African Qualifications Authority (SAQA) to oversee the development and implementation of the NQF. In the period that followed, education institutions were required to ensure that the curricula contents of all existing and any new learning programmes were aligned directly to learning outcomes (Allais, 2011). As SAQA documents at the time explained, the main characteristic of learning outcomes was that they were developed by a variety of stakeholders including educators and education institutions but separately from the education institutions as Stephanie Allais (2011, p. 346) explains:

> The key design feature to realise these purposes was the idea of learning outcomes, developed separately from educational institutions and educational programmes, against which learning would be delivered, assessed, quality assured, and certified

Allais (2011) has argued that the inclusion of a variety of stakeholders in the development process for learning outcomes was in response to the previous apartheid government's control through prescribed curriculum content. Additionally, she argues that this was seen to provide industry stakeholders a larger role in developing learning outcomes. SAQA created 12 National Standards

Bodies, which were stakeholder-based bodies that were responsible for the development of qualifications and unit standards/learning outcomes (Allais, 2011). In turn, the National Standards Bodies created many Standards Generating Bodies—made up of experts and stakeholders—to develop the outcomes-based qualifications and unit standards/learning outcomes (Allais, 2011). The period saw hundreds of qualifications and unit standards registered under the NQF.

The NQF was intended to structure South Africa's education and training system around outcomes-based qualifications (Allais, 2011; Muller, 2004). The integrated centralised framework followed developments in the United Kingdom (UK) and New Zealand, by "eliminating artificial divisions between mental and manual labour" (Muller, 2004, p. 225). It blurred the distinctions between discipline-based and practice-based learning by promoting a single concept of outcomes to define, and against which to assess, all types of learning (Muller, 2004). Johan Muller (2004) highlights how the policy intentions were that the design of all learning programmes, whether they were vocational or higher education qualifications, would be driven by outcomes-based education, which was the basis of learning programmes and assessments.

Pam Christie (1997, p. 63) observes that the "outcomes-based approach" allowed for "different learning contexts, curricula, assessment and learning pathways to be articulated into a single system", which, in her view, was primarily aimed at addressing equity concerns. In other words, while learning outcomes were central to the NQF, its introduction was underpinned by ideological concerns. The ideological concerns were tied to the uneven quality of education delivery inherited from the apartheid government. Allais (2011) explains that the apartheid government used education system reinforced racial divisions by engendering social and economic inequities through either denying access to education or providing inferior quality education by controlling curriculum content. Mostly, the development of outcomes by stakeholders was considered an alternative to the control of education exerted by the apartheid government. The use of outcomes as a central approach to all learning was intended to lead to equal delivery of quality education across the whole system.

Thus, for the post-apartheid democratic government, the NQF embodied the country's high expectations of systemic change in the post-school education system. The NQF was intended to unite a fragmented education and training system and to create a framework that set standards for high quality and equal education (Allais, 2007). Given the "racially divided, unequal, and mainly weak education system" that had developed under apartheid, there was unity across the political

spectrum and among policymakers and academics alike around the idea of the NQF (Allais, 2007, p. 2). Allais (2007, p. 2) cites the Ministers of Education and Labour (Departments of Education and Labour 2002, p. 5) in her explanation of how the NQF united the whole training system: "The National Qualifications Framework was established as an emblem and instrument of the single national high-quality educational and training system that democratic South Africa aspired to create".

The stakes were thus notably high, with the NQF viewed as an instrument of systemic change. One aspect of the NQF that Allais notes is that it was far-reaching with ambitious goals to change all aspects of education provision. She explains how the outcomes-based qualifications of the NQF were viewed:

> as vehicles to improve relationships between different sectors of education and training, as well as between different countries; improve relationships between education and training and labour markets; support learners to move between sectors and to enter or re-enter education and training; enable the recognition of prior learning; improve quality and relevance of qualifications by involving industry in the setting of standards or learning outcomes, and improving the status of technical vocational education and training. (Allais, 2007, p. 3)

In South Africa, the creation of a single education system that could improve the relationship between education and training was a particularly important ideological concern in the aftermath of apartheid. Christie (1997) outlines how policy planning prior to the democratic election drew on international policies through engagement with the literature and visits, as well as through the work of local and foreign consultants. She argues that the adoption of an outcomes-based approach through large-scale education reform was intended to transcend racial inequalities and to serve the pursuit of education and training as a fundamental human right. Looking back at the 1992 National Education Policy Investigation, Allais (2007) suggests that a shift foregrounding competence and skills, rather than content, was adopted as an equity move.

The NQF's outcomes-based qualifications structure was viewed as the primary instrument of reform to address the South African education system's problems of fragmentation and uneven quality (Christie, 1997; Muller, 2004). The outcomes-based qualifications contained the notion that learning outcomes could drive all education processes (Allais, 2006). As Allais (2014, p. 272)

argues, learning outcomes were seen as a clear and transparent method of configuring a qualification, with associated expectations of transparency in both the curriculum and assessment of the learning programme. Yael Shalem and Lynne Slonimsky (1999, p. 6) discuss how the idea of learning outcomes was adopted due to the perception that they make teaching practice explicit and transparent, which policymakers argued would lead to competent teaching. The intention was to use learning outcomes to disclose the meaning of the level and content of training to different stakeholders (Shalem et al., 2004). However, their work shows that using learning outcomes and design down do not foreground knowledge specification as the basis for curriculum development.

Allais (2014) further argues that there appeared to be value in making education more transparent by removing education institutions as the creators and transmitters of knowledge. Her observation relates to the NQF's ideological aspirations of inclusivity and equity (discussed earlier). She explains that the dominant perception at the time was that people who were not education specialists but had knowledge of what was relevant and essential to everyday life in general and to work more specifically were better placed to specify outcomes for education. In her extensive work on the historical development of the NQF and the logic underpinning it, Allais (2014) explains that the idea that learning outcomes defined by employers would lead to demand-driven education was dominant in the NQF, and also a strong theme in higher education and vocational education policies. As I explain later in Section 1.3 (p. 10), employers' views have been prioritised in developing learning outcomes in vocational education. What is important to note here is that several prominent scholars have highlighted the pervasiveness of the logic of outcomes in every aspect of qualifications, curricula content, and assessment of learning programmes in South Africa.

Yet, as Christie (1997, p. 56) points out, notions of competence, prior to the 1994 elections, were much broader than the narrow focus on task performance to be found in the outcomes-based qualifications of the NQF. She explains that a broad conception of competence was central to the education and training policy agenda. Stakeholders such as the African National Congress (ANC), Congress of South African Trade Unions (COSATU), and Private Sector Education Council (PRISEC) were drawn into one common way of thinking of competence: that it "should embrace the ability to apply skills to performing a task, and encompass theoretical understanding of the task, as well as the ability to transfer knowledge, skills and understanding to another context" (Christie 1997, p. 56). Christie (1997) highlights that there was an intention to use a more encompassing notion of competence in learning supported by a broad group of stakeholders (ANC, COSATU, and PRISEG), which was necessary for the equity-focused post-apartheid

education system. However, as discussed in the next chapter (2) the broad notion of competence was lost through the use of CBT methods, which narrowed competence to task performance, in the outcomes-based qualifications of the NQF.

1.2 Problems with Implementing the Outcomes-Based NQF

Much of the criticism of the South African National Qualifications Framework's outcomes-based approach to qualifications and curricula is common to critiques of competency-based training approaches: a key concern about the NQF was the use of concepts of competence that are either too narrow or underpinned by a task-based view of competence and standards (Allais, 2012a; Young & Gamble, 2006). Critiques of CBT focus on how design down of outcomes-based qualifications into curriculum content undermines knowledge in the curriculum (Mansfield, 1989; Muller, 2009; Wheelahan, 2015); this issue is discussed in further detail in Chapter 2 Section 2.4 (p. 31). Here I highlight how the problems that were experienced seemed to undermine the goals of the NQF.

A major argument for aligning the fragmented education system using outcomes was that this would help to achieve equity in a context of uneven teaching and learning quality across different institutions. However, a significant body of research shows the inability of outcomes to communicate meaning, which leads to different interpretations by stakeholders, and in turn, to distortion of education and training programmes (Allais, 2012a; Muller, 2004; Wolf, 2001; Young & Gamble, 2006). As Allais (2012a) argues, outcomes do not facilitate judgement about an education programme's nature and quality because outcomes do not carry sufficient meaning, unless they are found within a curriculum or learning programme. They do not disclose the knowledge, within or across disciplinary and practice boundaries, that underpins them and can guide the development of curricula and/or learning programmes. In a similar vein, Alison Wolf (2001) also argues that standards for knowledge have been problematic because "extracting" or "inducing" knowledge requirements is bound to give rise to different interpretations of the standards and too much variation in curricula. The lack of clarity about meaning among stakeholders, with varying interpretations of knowledge requirements, suggests that equity with regard to the quality of teaching and learning across education institutions based on outcomes was unlikely.

As mentioned earlier, outcomes were intended to integrate the education, training, and certification system (Muller, 2004). In contrast, outcomes contributed to blurring the earlier distinctions between discipline-based and practice-based learning (Muller, 2004). Michael Young and Jeanne Gamble (2006) have critiqued learning outcomes and unit standards for assuming that learning and knowledge are the same. They argue that the lack of differentiation leads to the same level descriptors and criteria being applied uniformly to all learning and all knowledge, which can be problematic in different education institutions or learning programmes. In summary, learning outcomes are difficult, if not impossible, to translate into varied learning programmes for both teaching and learning processes in a vocational education system.

The South African NQF was criticised for being overly complex, and the language of outcomes and unit standards was alienating to education institutions (Allais, 2011). A long review of the NQF, from 2000 to 2007, found that various stakeholders and public institutions were frustrated with the NQF (Allais, 2011). As Allais (2011) highlights, where education institutions were strong, with the staff equipped with the necessary expertise and with professional relationships both with peers and industry, the possibility of delivering quality education in an outcomes-based regulatory environment existed. However, the reverse was most likely the case in weaker education institutions where a lack of expertise in staff, combined with difficulties in interpreting outcomes, further exacerbated the challenge of delivering quality education.

1.3 International Critiques of Outcomes-Based Reforms of NQFs

South Africa was not alone in pursing outcomes-based education reforms using national qualifications frameworks. Internationally, as Ken Harley and Volker Wedekind (2004) note, there was a move away from establishing a firm foundation in academic disciplines underpinned by knowledge. There were global political pressures for a shift towards "applied, responsible, problem-based lifelong learning systems in which knowledge is a commodity that is packaged and sold in chunks" (Harley & Wedekind, 2004, p. 27). Harley and Wedekind (2004, p. 27) argue that ideological and economic forces influenced a "dominant constructivist approach to learning that was underscored by a problem-based approach to learning". It can be argued that this approach to learning is prominent in outcomes-based national qualifications frameworks.

National qualifications frameworks have been implemented in different countries. An example of relative success is the French NQF based on the country's already existing labour market and

education system with strong relationships between stakeholders (Allais, 2017). Looking at the French NQF, Allais (2017, p.11) suggests that "frameworks which codify relationships between training levels and employment levels might seem to offer proof that qualifications frameworks can improve relationships between education provision and the labour market". However, the success of the French NQF may be challenging to implement in another country, as the existing relationships between stakeholders in France are not easy to duplicate elsewhere.

In some instances, where occupations are not regulated by license to practice requirements, it is believed that getting employers to specify learning outcomes for qualifications can lead to a better fit between education and work (Allais, 2017). Thus, the relationship between education and work in developing countries is externally imposed on the labour markets and education systems as a form of regulation and does not represent the underpinning relationships between labour markets and education stakeholders.

Generally speaking, a strong theme in South African policy interventions related to vocational education in recent decades has been to align education and work to improve employment outcomes for graduates, using learning outcomes in an approach very similar to competency-based training. For policymakers, the goal of a close alignment between education and work is for qualifications and (by implication) education curricula to adequately prepare students to participate skilfully in the workplace. Policymakers in higher education and training have grappled with the best route to train workers for the economy. Over the years, international agencies, such as the World Bank, International Labour Organisation (ILO), and the Organisation for Economic Cooperation and Development (OECD), have suggested countless national education policy interventions for meeting demand in the labour market (Fretwell et al., 2001; International Labour Office, 2010; Organisation for Economic Co-operation and Development, 2016).

The underlying message of such interventions is that accurately capturing labour market requirements and then effectively translating these requirements into training would result in a skilled population. This message is often premised on the idea that there is a close relationship between a skilled population, national economic growth, and lower unemployment. The latter are near-universal goals of most national ruling political parties. Hence, there is an undeniably appealing and straightforward logic in the idea of training to employment requirements. South Africa, too, is still influenced by this policy narrative in addressing its persistently high

unemployment rate—32.5 per cent in the fourth quarter of 2020 (Statistics South Africa, 2021)—and its quality concerns about the VET system.

1.4 The Emergence of Occupational Qualifications

The introduction of 'occupational qualifications' in South Africa, in 2012, can be seen as a policy response to the above-discussed problems with the NQF and concerns raised in the scholarly literature. In South Africa, the apprenticeship system during apartheid was closely aligned to the government's need to secure skilled work for the white population while denying access to training and employment in skilled work to the rest of the population. Unravelling the complex web of legislation, regulation, and intentions of the apartheid-era apprenticeship system is not the focus of this research study; however, a brief understanding of the structure of the apprenticeship system can provide a broader understanding of the problems with vocational qualifications—i.e. National Accredited Technical Education Diploma (NATED) and National Certificate Vocational (NCV)—and the subsequent introduction of occupational qualifications in South Africa.

During the Mineral Revolution, apprenticeships were strengthened with the establishment of a formal technical and vocational education and training (TVET) system in South Africa. Shaped in part by the 1922 Apprenticeship Act, under this system, apprenticeships became more regulated by education requirements, but which at the same time—in the context of racial segregation and oppression—excluded the primarily black population and prioritised white workers' privileges (Wedekind, 2018). Following the adoption of the Apprenticeship Act, apprenticeships in South Africa had a theory training component at technical colleges, with workplaces providing specific work experience and on-the-job training (Badroodien, 2004). Apprentices, thus, had employment status: i.e. an apprentice was an employee but had specified days to attend training. The training in the theoretical component was seen as a concept formation stage to strengthen and expand craft and trade practices (Badroodien, 2004). During this period, however, when technical colleges thrived, job reservation for white workers strongly influenced the labour market, which excluded most of the labour force during apartheid.

In the 1960s and 1970s, the absence of skilled labour was seen as a critical obstacle to economic growth (Chisholm, 2006). In 1981, the TVET system, which had been initially sponsored by industry, was de-racialised (Chisholm, 2006). The 1981 Manpower Act provided governance and regulation of the new apprenticeship and skills development system that opened skills training

programmes and apprenticeships to the country's black population. But, as the system became de-racialised, employers stopped sponsoring apprenticeships (Chisholm, 2006). While de-racialisation enabled black students to have greater access to preparation for intermediate and higher-level occupational categories, they were unable to secure on-the-job training to work in those occupations (Chisholm, 2006). In parallel to these changes, a 1995 investigative report on the quality of apprenticeships portrayed a weak system that delivered poor quality training, in which on-the-job training was largely unsupervised and apprentices had to learn via observation (Wedekind, 2018). As Wedekind (2018, p. 112) explains, the report found that "the theoretical curriculum offered in colleges was dated and devoid of any practical or work-based component, [which] finally resulted in a major curriculum reform fifteen years later". While the report played little part in the subsequent education reform processes in democratic South Africa, Wedekind argues that the concerns in the report were addressed in how the new Department of Education sought to shape processes and structures with education institutions and structures.

During apartheid, vocational qualifications from colleges were called NATED qualifications, which included the National Senior Certificate, National N-Qualifications, and National Integrated Certificates (Allais, 2012b). NATED refers to the National Technical Education programmes. NATED qualifications were assessed by the Department of Education and were the theoretical component of apprenticeship training. The qualifications were criticised for not leading to higher education, and as research showed at the time, for clearly not leading to employment (Allais, 2012a). NATED qualifications were still to be found in the initial implementation period of the NQF. From 2000 to 2008, several changes occurred, often in response to critiques of the NQF (Allais, 2006). A significant change occurred when the Department of Labour announced that the apprenticeship system would be coming to an end, which also signalled the end of NATED qualifications (Allais, 2006). They were replaced by the National Certificate Vocational, a qualification designed by the Department of Education. The NCV had a curriculum and an external system of examination (Allais, 2006).

Adrienne Bird (2010)—a policymaker who was influential in the changes that led to the introduction of both the NCV and then occupational programmes (later known as occupational qualifications)—identifies problems with the NATED programmes, such as the high unemployment rate among graduates, which she suggests was related to the lack of work experience acquired through the programmes. She cites the Gewer (2010) study, which showed that securing work experience was difficult due to the lack of incentives for employers to provide

work experience, which led to the removal of work experience from the programmes. While the subsequent discussions to address the problem with NATED programmes were complicated, Bird (2010) explains that what emerged from them was a learnership, provided by the Department of Labour, as a qualification that aimed to meet sectoral occupational needs. The learnership included both structured learning and work experience.

Sectoral Education and Training Authorities (SETAs) were created to administer funding and organise placements for students in the learnership programmes, replacing the industry-and-labour-led training boards of the apprenticeship system (Wedekind, 2013). But conflicting agendas between the national and local levels and between the SETAs and the Department of Labour—linked to political power and access to resources to deliver the apprenticeship skills programmes—contributed to problems with learnerships (Wedekind, 2018). Bird (2010) explains that there were problems related to the vague definition of the structured learning component which was the responsibility of the SETAs. She notes that several education theorists argued the learnerships were "devoid of disciplinary knowledge" (Bird, 2010, p. 4). She further explains that the formation of the Quality Council for Trades and Occupations (QCTO) was intended to solve the problem with disciplinary knowledge by "streamlin[ing] and organis[ing] these learnerships into more formal occupational qualifications – each with a formal 'knowledge component' as well as practical and work experience components" (Bird, 2010, p. 5).

In 2012, as part of the move towards solving problems in the vocational education system, occupational qualifications were introduced under South Africa's National Qualifications Framework. After a lengthy review, three sub-frameworks were added to the NQF to provide more relevant quality assurance to different parts of the education and training system: the General and Further Education and Training Qualifications Sub-Framework, the Higher Education Qualifications Sub-Framework, and the Occupational Qualifications Sub-Framework (Minister of Education and Minister of Labour., 2007; National Qualifications Act, 2008 [Act No. 67 of 2008]: Occupational Qualifications Sub-Framework [OQSF] Policy, 2014)

The 1998 Skills Development Act defines an occupational qualification as follows: "occupational qualification means a qualification associated with a trade, occupation or profession resulting from work-based learning and consisting of knowledge standards, practical standards and work standards"(Skills Development Act, 1998, 2010, p. 8). The introduction of the OQSF under the National Qualifications Framework was primarily concerned with developing qualifications for the

vocational education system based on "learning in and for the workplace" ((Skills Development Act, 1998, 2010, p. 11).

In 2010, the Quality Council for Trades and Occupations was established to oversee the design, implementation, assessment, and certification of occupational qualifications under the OQSF (Quality Council for Trades and Occupations, 2016). The introduction of the three sub-frameworks acknowledged that the different parts of the post-school education and training system required more relevant quality assurance (Minister of Education and Minister of Labour., 2007). Occupational qualifications seemed to reflect the state's commitment to solving enduring problems in South Africa's VET system, including low quality of training at education institutions, lack of appropriate training facilities, declining apprenticeships, and unmet employer expectations (Allais, 2011; Department of Higher Education and Training, 2013; Minister of Education and Minister of Labour., 2007)).

On the surface, the reform of occupational qualifications seemed to respond to critiques of the outcomes-based qualifications of the NQF. Occupational qualifications integrated theory/knowledge, practical skills, and work experience (National Qualifications Act, 2008 [Act No. 67 of 2008]: Occupational Qualifications Sub-Framework [OQSF] Policy, 2014, p. 22). As mentioned earlier, Bird (2010) has highlighted the problems with NATED qualifications and learnerships that led to the legislated integrated structure of occupational qualifications. More broadly, Muller was critical of the establishment of the SETAs as an effort "to 'pedagogise' what is essentially contextually tacit procedural knowledge" (2009, p. 220). He goes on to explain how driving knowledge structures through "contextually tacit procedural knowledge"—tasks in learning programmes—was problematic. He further explains that the problem with contextual coherence driving a curriculum is that it leads to a "segmentally connected [curriculum], where each segment is adequate to a context, sufficient to a purpose" (2009, p. 220). Contextually tacit procedural knowledge can be connected to the kind of knowledge that task performance prioritises in CBT approaches, which scholars were critical of in outcomes-based qualifications. The deliberate addition of knowledge modules in the curriculum framework as part of the regulatory guidance for occupational qualifications can be viewed as responding to outcomes-based qualification critiques of undermining knowledge to prioritise task performance.

Occupational qualifications are designed using a template to standardise the structure of the curriculum framework's occupational standards, knowledge, practical skills, and work experience

modules. The standardised templates embody (in part) the state's goal of improving the quality of VET programmes through a prescribed curriculum framework. The templates are populated through a series of workshops led by a facilitator appointed by the QCTO and a panel of experts and practitioners for the specific occupations (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014). For policymakers, occupational standards represent broad notions of competence based on occupational practice and specific tasks, which differs from outcomes-based qualifications.

The addition of the Occupational Qualification Sub-Framework to the NQF thus seemed, to some extent, to move away from outcomes-based qualifications and learning programmes. However, as I discuss further in the next section, there is reason to investigate whether the standardised design of occupational qualifications leads to a well-designed programme for preparation for occupational practice.

1.5 Research Problem

South Africa's current policy for occupational qualifications and associated curriculum frameworks claims to improve vocational education. It claims that the specification of knowledge, practical skills, and work experience modules in the intended curricula will improve the relationship between education and work. On the surface, the specification of knowledge modules seems to address a key critique of the National Qualifications Framework, under which the Occupational Qualifications Sub-Framework nests; this critique being that the NQF's focus on task performance in learning outcomes fragmented knowledge in the learning process. Additionally, the integration of work experience modules seems to suggest a solution to the previous critiques of NATED/NCV qualifications, which research suggested as unlikely to lead to employment opportunities. The two problems with knowledge/theory in learnerships and work experience in NATED/NCV qualifications appear to be solved in the integrated structure of the occupational qualifications. In the context of the problems occupational qualifications intended to solve, the focus on the main tasks of an occupation, which seems central in the standardised templates used for designing the occupational qualifications and their associated curriculum frameworks, signals that there may still be problems with how policymakers and regulatory bodies interpret how occupational training and practice occur. There are two problems that this section identifies.

First, this design focus is reminiscent of competency-based training, similar to the outcomes-based approach in the NQF which focused on task performance. The related problem is whether the prescribed templates for developing occupational qualifications and their associated curriculum frameworks can coherently structure the curriculum for preparation for what Christopher Winch(2010) calls "occupational capacity". Occupational capacity—further developed in Chapter 3—is based on the specialised knowledge that underpins practice. What remains unclear is whether the new design of occupational qualifications is an appropriate solution to the challenges facing learning programmes in South Africa's vocational education system. There is agreement among policymakers and academics that the previous unit standard qualifications and learning outcomes were problematic. As mentioned earlier, policymakers seem to be striving for a more holistic approach to occupational qualifications by aligning training to the work requirements of occupations and by specifying knowledge requirements. But the focus on deriving the contents for the curriculum framework from occupational standards/tasks has some similarities to outcomes-based qualifications based on task performance.

Second, the effort in designing an occupational qualification is based on the simplistic assumption that tying education more closely to work is a solution for improving access to and progression in work. The literature on developing occupational capacity portrays complex relationships between education institutions and work. Given that the curriculum framework in occupational qualifications does contain work experience modules, what remains unclear is how problems with students gaining work experience as part of their qualification are addressed in line with the relationships in the social context of colleges and lack of employer participation.

For example, a key study concluded in 2015 in Australia, *Vocations: The Link Between Post-Compulsory Education and the Labour Market*, looked at the education path that individuals took and how this related to the work that they entered into (Wheelahan et al., 2012, 2015). The Australian study found that there were vital and solid occupational pathways in higher-skilled occupations, where professional and occupational bodies specified entry requirements. This was not the case for lower-skilled occupations in the same industries. Regulated occupations with long periods of training and development, such as skilled trades and professions, had stronger links between education and work. However, the study found that links between education and work were weak in most labour market areas, and the link between education and occupational progression was limited. An important finding was that most people did not work in the specialised field for which they had studied. The researchers concluded that tying education more closely to work was not

the solution; instead, they called for social partnerships to create the links between education and work, and education and occupational progression. In addition, they found high degrees of mismatch between a person's qualification and their job in Australia, unless they were in a regulated occupation. Therefore, people might be at a disadvantage in terms of entering the labour market if their qualifications narrowly focused on training for specific work tasks.

The Australian study recommends that people should study in vocational 'streams', which would be broader and would allow the development of more transferable skills, enabling mobility in the labour market. Vocational streams can provide two benefits. First, practitioners in similar occupations share standard practices, knowledge, skills, and personal attributes. Second, social partners, such as employers, unions, professionals, occupational and accrediting bodies, and education institutions, and government can work together to develop the pathways for related occupations. The research thus suggests the introduction of vocational labour markets to link education and work; and the development of vocational streams that give practitioners in related occupations access to broader knowledge and practices, giving them transferrable skills to move in the labour market. In this regard, the Australian study is an insightful reflection on the need for general skills development in a liberal market economy, in which labour markets are less regulated than in collective skills formation systems. Importantly, from the perspective of this thesis, it describes occupational/vocational pathways as an alternative to outcomes-based approaches of CBT-driven education reforms (Wheelahan et al., 2015).

Vocational or occupational pathways suggest a broader notion of occupational qualification. Indeed, Jeanne Gamble (2021a, p. 257) has recently suggested that broad occupational qualifications are the better route for developing expertise, based on a study of occupations such as bakers and boat-builders. She describes how a smaller qualification unit for sectoral expertise, such as a learning outcome, does not facilitate technical specialisation development:

> Empirical findings suggest that, instead of a "lowest common denominator" entry-level qualification at the smallest unit of qualification, it is rather a "highest common denominator" broad-based qualification that will lift overall sectoral expertise and provide a foundation for further technical specialisation. It will set a minimum standard of expertise to which the sectoral labour force would need to adhere, and it will open up qualifications futures for all workers. (Gamble, 2021a, p. 257)

In sum, the problem that lies at the heart of this thesis is whether the standardised design form of occupational qualifications and their associated curriculum frameworks comprise real alternatives, such as Gamble's (2021a) broad occupational qualification routes and Wheelahan et al.'s (2102, 2015) occupational/vocational pathways, to CBT-driven outcomes-based approaches. This question rests on the assumption that the opposite of an outcomes-based qualification would be a broad-based occupational qualification.

1.6 Research Objectives

The research's primary purpose is to analyse the standardised templates of occupational qualifications and their associated intended curricula with the view to evaluate whether they contribute to coherent qualification and curriculum development processes.

Accordingly, the study asks:

Main Question

How does the standardised design form of occupational qualifications enable and/or constrain vocational education learning programmes in South Africa?

Sub-Questions

1. What form of curriculum is envisaged by the prescribed template for intended curriculum for occupational qualifications?
2. How is the process of developing occupational qualifications and associated intended curricula influenced by various stakeholders?
3. What kind of social factors affect learning programmes based in workplaces and education institutions in South Africa?

Based on insights from the established literature on competency-based training and occupations (discussed in detail in Chapters 2 and 3), my hypothesis is that the standardised design form of occupational qualifications does not lead to a well-designed curriculum to prepare for occupational practice. I argue that the design of occupational qualifications and intended curricula has similarities to outcomes-based qualifications, with a focus on task performance. But, as the literature suggests, an understanding of occupational practice in terms of task performance is too narrow, and as such, cannot inform a coherent qualification and curriculum development process,

which requires the components of the internal force of specialised knowledge. Additionally, a focus on task performance fails to recognise the influence of the external force of the social organisation of occupations. Both specialised knowledge and the social organisation of occupations underpin occupational capacity, which is developed in training for practice.

This chapter has provided an overview of the policy content of occupational qualifications in South Africa. The starting point was identifying the use of an outcomes-based approach in the overarching National Qualifications Framework as the key problem. The subsequent reform of occupational qualifications was partly a response to the critiques of outcomes-based qualifications, which undermined knowledge requirements and fragmented training in colleges and workplaces in the learnership model for apprenticeships. However, it is unclear whether the regulatory curriculum framework that integrates knowledge, practical skills, and work experience can guide a coherent qualification and curriculum development process. The next section provides an outline of the chapters in this thesis.

1.7 Chapter Outline

Chapter 2 covers the development and implementation of competency-based training, and its consequences. The chapter focuses on the CBT approaches that emerged in Anglo-Saxon countries, specifically the UK and Australia, in the 1980s, as part of education policy reforms targeting national regulatory mechanisms for qualifications. Importantly, the Anglo-Saxon experiences with CBT heavily influenced the early implementation of outcomes-based qualifications in South Africa under its NQF. CBT encapsulates the notion that the performance of tasks demonstrates competence. Most commonly found in outcomes-based qualifications in national qualifications frameworks, CBT approaches lead to learning programmes based on deriving curriculum content and assessment from learning outcomes, also referred to as employment standards, outcome statements, or occupational standards. The chapter foregrounds the development of learning outcomes and the use of 'design down' as the two primary methods of implementing CBT approaches. It also reviews the extensive critique of CBT-based education reforms, including the UK's National Vocational Qualifications (NVQs), drawing out the CBT focus on task performance as a fundamental weakness.

Chapter 3 analyses the notions of occupation and occupational capacity. It draws on the work of scholars such as Andrew Abbott (1988, 1989), Eliot Freidson (1973, 2001), Guy Standing (2009),

and Christopher Winch (2010, 2013, 2014, 2015), and in particular, I borrow Winch's notion of occupational capacity to explain expert practice and how specialised knowledge and social organisation shape it. I argue that the development of such occupational capacity is essential in learning programmes to prepare candidates for work. Centred on the notion of occupational capacity, as formed by specialised knowledge and the social organisation of work, this chapter lays the groundwork for Chapters 6 and 7, where I analyse the evidence from two occupations: plumber and electrician.

Chapter 4 discusses the research methodology. The thesis uses a case study design to analyse how standardised templates and instructions for processes lead to occupational qualifications and their intended curricula. The chapter identifies and explains the methods of data collection, including documents, interviews, and observations, used in the study in detail. It also discusses the challenges that I encountered during the research process, which led to additional fieldwork. Methodological decisions—outlined in detail in the chapter—were thus driven by an iterative approach to theory, and data collection and analysis.

Chapter 5 sets the stage for the case studies and provides an overview of the role of different actors involved in the development of occupational qualifications, their associated intended curricula (curriculum framework and the national occupational curriculum content). In so doing, the chapter provides a better understanding of the process, from the initial step of application to develop a qualification to the development of an occupational qualification, and its intended curricula for the development of learning content. At first glance, the different stages of the process seem to contain several quality checks to ensure the development of a training programme for occupational practice with the involvement of a diverse group of practitioners and experts. However, later in Chapters 6 and 7, when considering the evidence from my two case studies, the analysis shows whether the standardised template constrains or enables the development of intended curriculum content through the prioritisation of task performance.

Chapter 6 presents evidence, showing the persistence of CBT characteristics, from the guidance and instructions for templates for occupational qualifications and their intended curricula (curriculum framework and national occupational content curriculum), alongside examples from the intended curricula for plumber and electrician. The evidence shows how the CBT methods of learning outcomes and design down from tasks reduce types of knowledge for curriculum contents and how the sequencing of curriculum content according to tasks breaks down the structure of

systematically organised knowledge. This breakdown occurs when aspects of knowledge are chosen based on only the knowledge applicable to task performance. Notwithstanding some variation from CBT, the evidence altogether shows the presence of learning outcomes and design down from tasks in the two occupational qualifications and their associated curricula.

Chapter 7 presents two sets of evidence on factors in the social organisation of occupations that shape the plumber and electrician occupational qualifications and their intended curricula. The first set of evidence engages with how the role of various actors is defined by the state, particularly through the use of a task-based approach in its standardised templates, which has consequences for the development of occupational capacity. The defining role of the state can be identified in the diminished notion of know-how in occupational qualifications, the rigid and generic structure of the qualifications, and decontextualised foreign assistance. The second set of evidence relates to factors within the social organisation of occupations that are not recognised due to the focus on task performance in the intended curricula. The factors identified in the electrician and plumber occupations include the lack of employer willingness to train, reduced opportunities for know-how development in the workplace, and deskilling resulting from changes in the workplace that ignores broader occupational goals, undermining the development of occupational capacity.

Chapter 8 brings together the evidence presented in Chapters 5, 6, and 7 through identifying four claims that show how vocational learning programmes are constrained by occupational qualifications. First, the discussion outlines how CBT approaches are found in the analysis of occupational qualifications and their intended curricula and how they lead to a reduction in the types of knowledge due to the use of task-based standardised templates. Second, sequencing of curriculum content according to work/occupational tasks further breaks down systematically organised knowledge for teaching; this is discussed alongside the theoretical work on specialised knowledge from Chapter 3. Third, the discussion draws out how the state, through legislation and standardised templates, has shaped vocational learning programmes according to a distorted version of 'work readiness' as task performance that ultimately excludes other actors in the social organisation of occupations from fully participating in the processes. Fourth, there is a lack of recognition of social factors that affect curriculum content and workplace training; these factors are overlooked by narrowly focusing on task-focused intended curriculum content. The chapter closes with a discussion on how qualifications and learning programmes that develop occupational capacity need to consider both specialised knowledge and social organisation of occupations.

Chapter 9 outlines the two contributions that this thesis makes to current and future research. First, the thesis contributes to research uncovering the general principle of competency-based training approaches degrading curriculum. The analysis showed that occupational qualifications and their associated intended curricula relates to occupational standards, which are similar to but somewhat broader than learning outcomes that are designed down into guidance for curriculum content. Second, the research makes a theoretical contribution by strengthening conceptual understanding of occupations through the development of an occupations conceptual web (Chapter 3). The occupations conceptual web contributes to ongoing theoretical work by scholars on alternatives to CBT approaches in education reforms, such as Wheelahan et al. (2012, 2015) on occupational/vocational pathways and Gamble (2021) on broad-based occupational qualifications.

CHAPTER 2. COMPETENCY-BASED TRAINING

2.1 Overview

This chapter covers the development, implementation, and consequences of competency-based training. It focuses on the CBT approaches that emerged in Anglo-Saxon countries, specifically the UK and Australia, in the 1980s, as part of education policy reforms targeting national regulatory mechanisms for qualifications. Most commonly found in outcomes-based qualifications in national qualifications frameworks, they led to learning programmes based on deriving curriculum content and assessment from learning outcomes, also referred to as employment standards or outcome statements. Importantly, the Anglo-Saxon experiences with CBT heavily influenced the early implementation of outcomes-based qualifications in South Africa under its National Qualifications Framework.

Competency-based training is based on the notion that the performance of tasks demonstrates levels of competence. The focus on task performance leads to assessment-led curricula where students are graded for what they can do, rather than what they know. As Gilbert Jessup (1992, p. 194) argued, when advocating the use of outcomes in the UK's national qualifications framework:

> The idea, which is far from new, is that while developing occupational competencies, or educational attainments, students are also developing fundamental skills such as communication, problem solving and numeracy. In fact, it might be argued that the primary purpose of education is to develop such skills as they offer the potential for transfer to other pursuits later in life. Employers often place considerable emphasis on the attainment of core skills in recruitment.

Jessup (1992, p. 189) contended that "core skills are described to illustrate how outcomes can be specified to meet educational objectives as well as those of occupational competence." The underlying argument of CBT advocates is that students are better prepared for work if they can perform the tasks required in the work environment. However, the decades since the implementation of CBT have provided retrospective insight into the negative consequences of CBT-driven reforms in education. As discussed in this chapter, a key revelation has been that tasks are a problematic guide to, and organiser for, curriculum content.

The focus on task performance in CBT approaches in education reform is unique to Anglo-Saxon countries. Scholars explain that the focus on behavioural aspects of competence has its roots in the US which was subsequently drawn on by Anglo-Saxon countries (Harris et al., 1995; Wesselink et al., 2007). The nature of CBT, more specifically Comprehensive Competency Based Education (CBE), in European countries draws on a much broader definition of competence from Germany and France (Sturing et al., 2011, p. 268). Wesselink et al. (2007) quotes Martin Mulder (2001, p. 76) when defining Comprehensive CBE where "competence is the integrated performance oriented capability of a person or an organisation to reach specific achievements'. As Wesselink et al. (2007, p. 39) explains in Europe, competency focuses primarily on integrated ability of the person that leads to the "authorisation to do a task". In contrast to the early US conceptualisation of competence based on "detailed analyses of behavioural aspects of professional tasks", comphensive CBE embraced a more holistic approach to competence (Wesselink et al., 2007, p. 40). Since South Africa primarily draws on the Anglo-Saxon approaches to CBT, this chapter does not contain a detailed literature review of Comprehensive Competency Based Education (CBE) found in some European Countries.

The chapter unfolds in three sections. Section 2.2 examines the form which CBT has taken in Anglo-Saxon countries, while highlighting the centrality of learning outcomes and design down to the outcomes-based approach to qualifications and learning programmes. Section 2.3 focuses on the implementation of CBT-based National Vocational Qualifications in the UK. Section 2.4 then introduces and reviews the extensive critique of CBT reforms in education, including NVQs, in the literature. In so doing, the chapter provides a foundation for the later discussion, throughout Chapter 6 on similarities between CBT approaches, and South Africa's occupational qualifications and associated intended curricula, while opening the door to consideration of alternative approaches to vocational education and training.

2.2 What Is Competency-Based Training?

Competency-based training approaches are based on the understanding that competence can be defined and translated into qualifications and curricula. In the UK, the Further Education Unit defines competence as the "possession and development of sufficient skills, appropriate attitudes and experience for successful performance in life roles" (Harris et al., 1995, p. 20). In Australia, competency is defined as a focus "on what is expected of an employee in the workplace rather than the learning process; it embodies the ability to transfer and apply skills and knowledge to new

situations and environments" (Harris et al., 1995, p. 20). The definition focuses on performance as doing tasks, managing different tasks, problem-solving irregularities, and understanding and managing responsibilities and expectations in the workplace (Harris et al., 1995, p. 20). In more specific instances, such as when defining industrial competence, the definition of competence focuses on the application of specialised knowledge and skills that are required for employment in a particular occupation in a particular industry (Harris et al., 1995, p. 20). All in all, the different definitions of competence identify the performance of tasks as the main priority.

The development of learning outcomes and the subsequent use of design down to generate curriculum content, are two core methods of implementing CBT approaches. Using these two methods focuses outcomes-based qualifications and curriculum content on the performance of tasks.

2.2.1 Learning Outcomes

In CBT approaches to vocational education and training, learning outcomes are often synonymous with competency statements/standards, employer-led or employment outcomes/standards, and outcomes statements. While the terms "competency statements /standards" (Harris et al., 1995) and "employment standards" (Winch, 2011) tend to be used in the description and analysis of employment requirements, the term "learning outcomes" (Allais, 2012a; Wheelahan, 2015; Young & Gamble, 2006) is more often used in the context of regulation of qualifications or learning programmes in education institutions. Be as it may, they all focus on the performance of narrowly defined work tasks as the basis for articulating education requirements. For the purposes of this thesis, I will be using the term 'learning outcomes' for consistency, except when quoting directly.

As mentioned earlier, CBT focuses on distilling the performance of job functions. The development of learning outcomes based on the tasks that were believed to be required in the workplace, was a core element of CBT approaches (Harris et al., 1995). Wolf (1989) shows how CBT approaches in the 1980s were used to break down jobs into skill elements, which then represented objectives in training programmes. She further explains that the development of national vocational qualifications was often associated with a complex set of standard-setting, which was intended to increase the quality of the qualifications and meet the demands of

employers.[1] Learning outcomes were derived from analysis of employment requirements: the duties employees must carry out, with specific attention paid to purpose and outcome (Harris et al., 1995). The skill elements/objectives were called employment standards, here referred to as learning outcomes (Winch, 2011). These learning outcomes were the product of analysis carried out by or on behalf of employers in the relevant sector, or supported by them (Winch, 2011). In principle, the sets of learning outcomes were agreed upon by employers and implemented by educators. The idea was that the process of deriving learning outcomes from jobs in the workplace would ensure that students were able to perform tasks in the workplace according to employer requirements.

Standards are often external points of reference for the individual to demonstrate competence against a particular outcome (Mitchell, 1989). The complex standards development process contains different ways of deriving learning outcomes. Learning outcomes are often derived through the Delphi[2] and DACUM[3] processes, which involve consensus-building and brainstorming by groups of experts (Wolf, 1989). A popular technique for deriving learning outcomes is functional analysis, which originated in the United States (US). Lindsay Mitchell (1989) highlights that functional analysis contains the following characteristics:

- it foregrounds activities and their associated outcomes rather than capture non-technical aspects of the work role, to provide a clearer picture of the expectation of employment; and
- it initially groups expectations of employment as a whole and then works from the top down, dividing the role into occupational areas with associated purposes and functions.

Techniques such as functional analysis thus result in a certain form of learning outcomes: "observable behaviours that are aligned to a particular task, role or requirement" (Wheelahan, 2015, p. 758). A particular role or requirement within a learning outcome is related to the competence statement or standard (Wheelahan, 2015). Also, the learning outcomes tie knowledge to a specific contextual application—i.e. task performance—in the workplace (Allais, 2006). In training, there is thus a strong emphasis on the required outcomes for the workplace.

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[1] It is worth noting here that interpretation became a key challenge, as standards became increasingly complex with details being continually added to clarify their meaning.

[2] Delphi is a technique in which multiple experts are sought to form a consensus, in this case on outcomes. The strength of the consensus lies in the number and possibly the variety of experts who are consulted.

[3] DACUM stands for Develop a Curriculum and is a method to systematically define the tasks, jobs, competences, and tools associated with a certain type of workplace (Deissinger & Hellwig, 2005, p. 13).

Further, a fundamental purpose of functional analysis is to assist in the assessment of learning outcomes. The aim of assessment is to recognise achievement and to judge the learner's performance against learning outcomes towards qualification in the certified areas of competence (Mitchell, 1989). This means that learning outcomes are defined as specific inputs and programmes, intended to function independently of the route learners take to be qualified (Allais, 2006). Additionally, advocates of CBT argued that an explicit statement of broad learning outcomes assured consistent outcomes, in comparison to using learning inputs such as duration, location, type, and learning content to derive the contents of learning programmes (Keevy et al., 2008, p. 44). They argued that consistent inputs did not always mean consistent outcomes. Emphasising the performance of work tasks when defining learning outcomes meant that assessment was geared towards identifying and validating performance of the tasks as competence for the workplace.

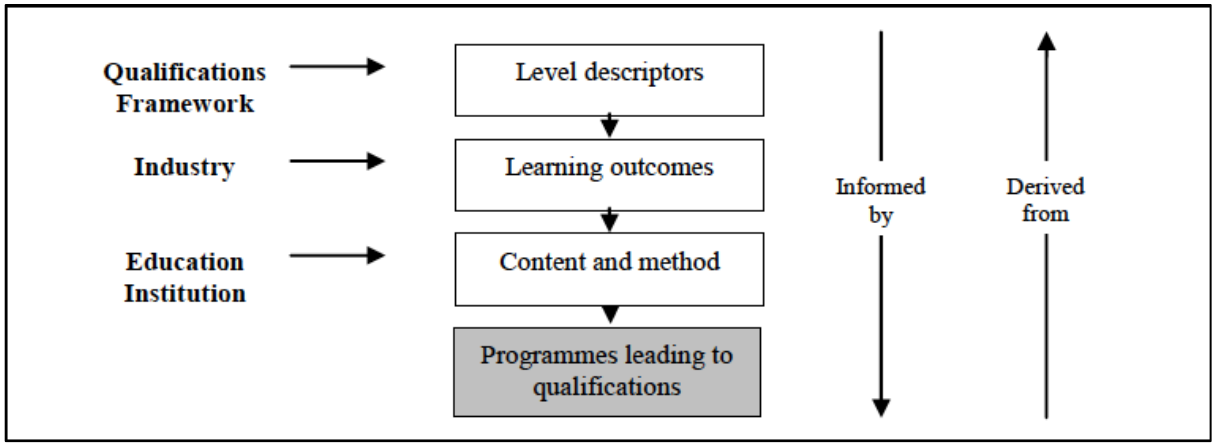
2.2.2 Design Down

Design down is the process used to derive curriculum content from learning outcomes. In CBT approaches, knowledge is seen as embedded in the learning outcome (Allais, 2006). Designing down means that knowledge areas are selected in relation to the requirements for achieving a specific competence, rather than to the logic and internal requirements of a knowledge area (Allais, 2006). As a result, curriculum content, learning methodologies, and assessments are derived from learning outcomes in which the outcome is specified, but not the content (Allais, 2006). Essentially, as Wheelahan (2015) highlights, learning outcomes are translated into a curriculum that prioritises procedural knowledge, which is problematic.

Even so, policymakers have tended to favour a competency-based training approach to reforming vocational education for several reasons. First, as (Wolf, 2001) explains, it has been argued that a competency-based system is more transparent than a traditional academic one that focuses on curriculum content. For advocates of CBT, the transparency is based on the clear learning outcomes in the performance criteria for an assessor to determine if a student has, or has not yet, achieved competence. Second, the use of learning outcomes is seen to carry value, since they are advocated for with the idea that they will lead to qualifications that appear to be 'relevant' and easily understandable to the actors in the labour market, particularly because employers are supposed to specify the learning outcomes. In the UK and Australia, as well as South Africa,

learning outcomes have been derived from analysis of employment requirements in terms of the functions employees have to carry out (Allais, 2012a; Wolf, 2001).

Design down, as Yael Shalem et al. (2004) explains, is when segments of curriculum content were chosen based on an outcome rather than on bodies of knowledge. (I explain their work in more detail later in Section 2.4 p. 31). Policymakers use their notion of design down in qualifications, which is explained in a concept document on transnational qualifications, developed by a team led by the South African Qualifications Authority and international technical experts, for the Commonwealth of Learning (Keevy et al., 2008) as cited by (Allais, 2012a). Figure 2.1 Keevy et al. (2008, p. 44) depicts the design down process in qualification design, including the role of various stakeholders. "Designing down" leads to qualifications which are "derived from outcomes (specified by industry) and content and methodology (selected by education institutions)" (Keevy et al., 2008, p. 43). The document authors further explain that in the "new hierarchy… education providers are no longer the leaders and standards-setters, and content (or inputs) is no longer the starting point" (Keevy et al., 2008, pp. 43–44). They argue that "learning outcomes… provide a firmer basis for comparison than inputs and… [therefore] enable better articulation between modules and programmes" (Keevy et al., 2008, p. 44).



1 Figure 2.1 Graphic Representation of the Process of Designing Down

Note: Reprinted from Keevy, J. et al. (2008). *Transnational Qualifications Framework for the Virtual University for Small States of the Commonwealth: Concept Document*, p. 44.

2.3 CBT-Based National Vocational Qualifications in the UK

The underlying logic of CBT is that learning outcomes can capture the performance of a work task, which can then be clearly articulated into a qualification and curriculum. The UK's National

Vocational Qualifications are an example of qualifications heavily based on this CBT logic (Young, 2011). Introduced in 1987, NVQs embraced the idea that qualifications could be described as written outcomes, independent of the learning process. The written outcomes were later referred to as occupational standards in the UK and in countries such as New Zealand, and as unit standards in South Africa. They were seen to be a kind of "new standard which would provide a rigorous and more employment-relevant alternative to the knowledge-based approach to standards associated with written examinations"(Young, 2011, p. 264).

Generally speaking, education reforms are strongly associated with efforts to solve broader societal problems. In the UK, the introduction of NVQs followed a recession and a period of labour unrest in the 1970s, during which unemployment reached levels similar to those of the Great Depression in the 1930s (Wolf, 2002). During this period, youth training programmes were established to serve as temporary work schemes, subsidise adults' temporary jobs, and run short courses. The programmes were viewed as a temporary solution. In 1981, the British government put forward a training initiative based in the belief that all the country's problems were rooted in the fact that training had not been given sufficient priority (Wolf, 2002). Advocates of the initiative argued that there was a need to exploit growing markets, and that the UK needed to upgrade its skills to compete with countries such as then West Germany and France. The specific objectives of the initiative were to upskill adults and to develop an apprenticeship system that enabled them to meet specifically agreed standards of skill. In other words, as Wolf (2002) highlights, formalising and investing in vocational education seemed to provide a solution to the problems of unemployment and economic recession in the UK. Policymakers believed that employers would recruit graduates if more skilled graduates were available from training programmes, thus alleviating unemployment.

In the context of continuing high unemployment and weak economic growth in the 1980s, there were growing concerns, among CBT advocates, about employers feeling that the vocational education and training being provided in the country was not relevant to employment (Jessup, 1989). Central to these concerns was the idea that education and training in vocational fields concentrated on acquiring knowledge and theory, rather than on task performance as a core characteristic of competence (Jessup, 1989). CBT-based reforms of vocational education were thus introduced to prepare young people for work, as a response to the problem of unemployment (Harris et al., 1995); and, more specifically, to address concerns about the relevance of training to employment.

The 1988 White Paper recommended that standards of competence linked to employment requirements should be developed by industry-led organisations and cover all sectors and occupational groups (Harris et al., 1995). Subsequently, the National Council of Vocational Qualifications was created to design and implement the new competency-based National Vocational Qualifications (Burke, 1989). These qualifications were awarded based on competence measured in terms of the performance of work activities and assessed, where possible, in the workplace (Burke, 1989). This marked the first effort to reform the vocational education system and establish CBT in the UK.

British policymakers prioritised a version of CBT that sought both to isolate units of competence and to readily combine these units into a qualification for employment. This emerging CBT model was used as the basis for the country's VET system. A qualification system provided the structure for vocational education and training, with standards serving as the basis for qualifications (Jessup, 1989). In this regard, British policymakers were adapting a competency-based approach to education originating in the United States, while trying to address the problems with that approach using functional analysis. The US approach was perceived to be too narrow and task-oriented, and functional analysis was seen to solve the problem (Harris et al., 1995). Specifically, British policymakers used functional analysis as the primary method for developing more comprehensive competency standards (Harris et al., 1995). The result was that in the UK, competency standards had 5–20 units of competence, which served as mini qualifications. The implication was that doing jobs involved doing work that could be broken down into employment functions, i.e. units of competence; and qualifications were an assembly of units of competence (or learning outcomes).

Further, the idea was that units embodied employment functions that could be shared across multiple jobs and could be relevant to several occupations (Harris et al., 1995). Each unit could, in principle, be accumulated credit towards a qualification. Credits could be transferred between qualifications and occupations, without any unnecessary duplication (Harris et al., 1995). In other words, qualifications were based on units that manifested areas of competence with an independent value in employment, and which could thus be separately assessed and awarded (Jessup, 1989). Various UK national bodies provided oversight of the qualifications obtained based on the (re-)arrangement of units (Jessup, 1989).

2.4 Critiques of CBT

The use of CBT approaches in education has given rise to an extensive critique in the literature. The debate among critics can be contentious. On the one hand, there are those who argue that the implementation of CBT approaches has not been rigorous and has not been adequately followed, i.e. that learning outcomes have not clearly outlined the performance criteria, but instead focussed on specifying curriculum content. On the other hand, there are those who argue that the problem lies with CBT's task performance-focused learning outcomes, which are then designed down into qualifications and learning programmes. Policymakers as well as scholars can be found on both sides of the debate. This section aims to understand the varied critiques of CBT approaches and their associated negative consequences. In so doing, the discussion provides an important insight that is relevant to the broader objectives of this thesis—namely, the notion that distilling work in jobs into task performance as a starting point for developing qualifications and curricula, may be problematic.

From a broader societal perspective, Winch (2011) and Moore (1989) reflect that learning outcomes in CBT approaches do not adequately capture work in jobs or occupations. As Winch (2011, p. 95) notes regarding skills, "there is no settled view within the English trades and not even within many specific trades as to what the appropriate level of knowledge and practical ability should be", even though there seems to be a settled view in terms of statements of competences and skills on the surface. Winch points out that although training initiatives in the UK in the 1980s presented competencies as if all employers/trade unionists/educators had agreed on them, this was not the case in reality. In a similar vein, Wolf (1989) argues that the British system of competency-based standards tried to replicate Germany's coordinated system of vocational education but failed. Winch (2011) and Wolf (1989) are making an important contrast between the UK system of competency-based standards and coordinated German vocational education. As scholars such as Wolfgang Streeck (2012) have argued, the German vocational education system contains a long tradition of relationships among stakeholders (employers, educators, trade unionists, and state officials) who jointly administer and regulate training programmes. Additionally, Winch (2011) notes that competence in the German system is more broadly defined than in the UK system, making comparisons difficult. Thus, compared to the German system, the UK system of competency standards only appears to have a coordinated system or "settled view" of the appropriate level of knowledge and practical ability.

Moore's (1987) work on "new vocationalism" in the UK identifies problems arising from its NVQs. He argues that "the use of occupational, behavioural objectives in constructing the curriculum entails a process of codification through which a particular ideological representation of the needs of industry is translated into curriculum form and associated practice" (Moore, 1987, p. 230). In critiquing this paradigm of new vocationalism that emerged in the 1980s, Moore (1987, p. 235) argues that "the behaviourist occupationalism of 'the new vocationalism' attempts to integrate educational practices with its version of the reality of 'the world of work'". He further argues that new vocationalism tries to link education and production through a particular representation of work. Moore (1987) explains that the representation involves institutional and curricular changes that dramatically reduce the autonomy of the education system and teaching profession. He shows that the new vocationalism method of deriving the curriculum restricts the elaboration of knowledge by both students and teachers. Moore's (1987) work relates strongly to the introduction of National Vocational Qualifications in the UK (discussed earlier).

Moore's (1987) argument is essential to understanding that particular representations of occupations have implications on how work is embodied in learning programmes—a core idea in this thesis' discussion on training for occupational practice. Framing occupational practice narrowly as the foundation for preparation for work has far-reaching consequences. Moore (1987) was concerned about how broader free-market economic policies identified the worker as having individualised labour market mobility through the development of skills (p. 234). Yet the reality was that the dismantling of trade unions and professional bodies, which had the power of collective bargaining for workers, did not lead to individual worker gains in terms of wages and labour market mobility. Instead, free-market economic policies led to distorted views of workers and the labour market (Moore 1987, p. 234). Moore's work shows how social and economic factors influence the way in which work is defined in broader systems that affect workers. His arguments about new vocationalism highlight how a focus on training for task performance in CBT approaches can distort an understanding of work which occurs in the wider context of social and economic processes.

Stepping down from the societal level to the context of work and occupations, there are three main criticisms of CBT approaches in the literature on education. The first set of concerns centres on notions of competence in learning outcomes. Wolf (1989), a prominent critic, argues that the conceptualisation of competence is inadequate in CBT. As she explains, a competent person has abilities and characteristics that are not equivalent to elements of competence derived from a job

analysis. The point Wolf (1989) makes is essential, because framing competencies in terms of task performance does not fully capture the reality that competence is based in an occupational/professional field and is not value-free or independent of work context.

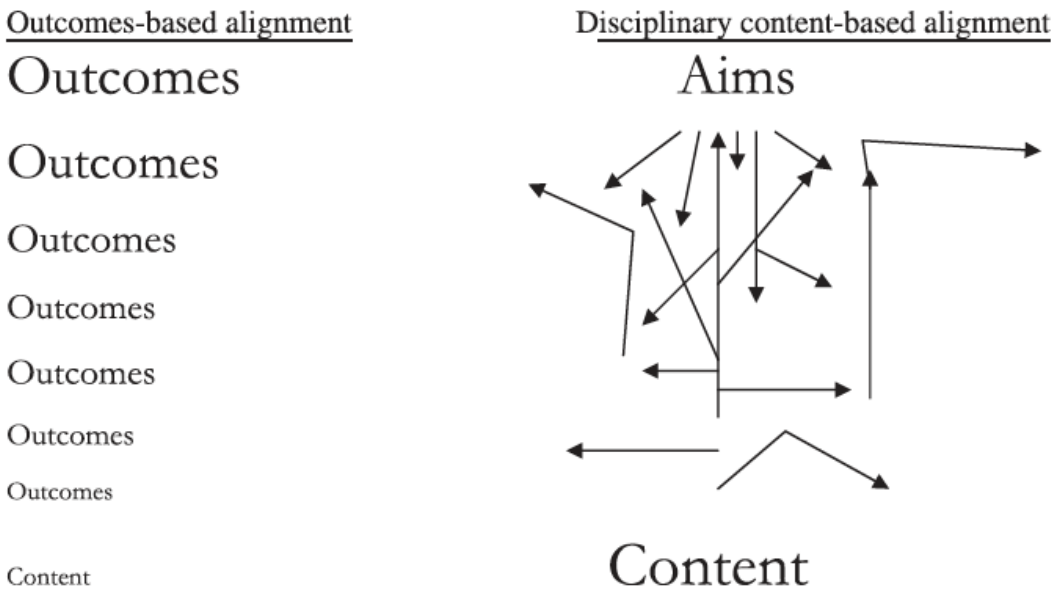
In a similar vein, Bob Mansfield (1989) expresses concerns about the consequences of basing curriculum on concepts of competence that either are too narrow or rest on a task-based view of competence in learning outcomes. For Mansfield (1989), a key problem with a task-based approach is that as occupations advance from foundation/entry-level occupations to higher levels, the analysis of tasks and duties can be insufficient when considering the complexity and responsibility of an occupational role. Task analysis supports work measurement systems that often do not consider unpredictable and unfamiliar aspects of work related to external influences on the work process (Mansfield, 1989). This lack of consideration for external influences leads Mansfield (1989) to contend that while task analysis fulfils its purpose of isolating work activities for work measurement and specific skills training, it is inappropriate for deriving standards for work role expectations. Both Mansfield (1989) and Wolf (1989) argue that skill- or task-based definitions of a job can lead to curricula that do not cover the full complexity and responsibility of an occupational role.

The second set of concerns relates to learning outcomes and assessment; in particular, to how learning outcomes are formulated, and whether they lead clearly towards the required knowledge. Mitchell (1989), for example, problematises how occupational standards/learning outcomes are defined and assessed. She is particularly concerned about the role of knowledge, or its lack thereof, in the performance of learning outcomes. Looking carefully at the evidence collected for assessment, she points out that this evidence takes two forms: performance and knowledge. Since competence is the ability to perform to the requirements of employment, ongoing work performance is the most likely indicator of ability. However, Mitchell (1989) contends that performance evidence is insufficient as there are not enough occasions to gather evidence of performance in a range of situations. There are thus gaps in the collection of evidence for assessment, as the knowledge required to perform a task in a range of situations is not assessed. Mitchell (1989, p. 63) argues that an individual must draw on both knowledge contents and cognitive processes to perform a task. In her view, thus, the sole focus on task performance can be problematic in terms of providing a holistic assessment of performance.

Mansfield (1989) expresses a similar concern. He notes that CBT assessment methods in vocational education and training typically focus on skills tests and on routine knowledge that is primarily relevant to task performance. In his view, this approach makes identifying knowledge elements a challenge, especially when assessing how occupational knowledge is applied in non-routine situations and in the broader social context of the workplace (for example, in social interactions between workers).

The third set of concerns focuses on the CBT process of design down to develop curriculum content. Shalem et al. (2004) explain the problems with design down in a paper based on the issues encountered during the outcomes-based quality assurance process for a course on mentoring at the School of Education at the University of the Witwatersrand. The course was rejected twice by the quality assurance body due to the evaluators' view that the outcomes did not meet the requirements of two unit standards. Shalem et al. (2004) suggest that rejection was related to the coherence of the learning programme's content. The content's coherence was based on the logic of the knowledge that informed the programme, and not according to how regulatory officials translated outcomes into qualification. Shalem et al. (2004) concluded that it was difficult for a quality assurance body to assess the learning programme because the quality assurance process rejected knowledge specification as the basis for curriculum development. Their analysis showed that for outcomes-based qualifications "quality assurance which regulates curriculum design and programme evaluation through a content/outcome alignment, marginalises disciplinary knowledge and, as a result, offers highly superficial regulation" (Shalem et al., 2004, p. 53).

Figure 2.2 visualises how, for Shalem et al. (2004), competence statements used as learning outcomes and designed down into curriculum can be restrictive and isolate different parts (left side), juxtaposed with how bodies of knowledge are organised in curriculum and have multiple connections (right side).



2 Figure 2.2 Outcomes-Based Alignment vs Disciplinary Content-Based Alignment

Note: Reprinted from Shalem, Y. et al. (2004). Outcomes-based quality assurance: What do we have to lose? *Journal of Education*, 34(1), p. 66.

Similarly, Young and Gamble (2006) point out that using outcomes and unit standards sets up the basis for assessing what people can do, rather than what people know. Advocates of CBT, such as Jessup (1989), emphasise what a person can do, which embodies what a person needs to know. However, Young & Gamble (2006) explain that the problem with designing down from learning outcomes lies in the assumption that what a person needs to do will lead to what they need to know. This problematic CBT notion that knowledge is somehow implicit in the performance of a task finds its way into standards. Critics of CBT argue that due to the nature of learning outcomes, design down does not translate easily into the curriculum of a learning programme, with crucial content getting left out.

Vocational qualifications and curricula (for example, for plumbers or electricians) have an inherent requirement that a graduate must be able to do certain kinds of work. Some might interpret knowledge-focused criticisms of CBT as unreasonable, based on the sentiment that an individual with a vocational qualification is concerned with *doing* work. Yet, as Winch (2010) argues, knowledge concerns in a learning programme need to consider developing a graduate's capacity to practice in an occupation. As he explains, training should contain the sequencing of different knowledge types and skills learnt in both work environments and institutions. Wheelahan (2015,

p. 758) provides a valuable comparison with academic curriculum while arguing in favour of a knowledge-rich vocational curriculum:

> VET curriculum differs from academic qualifications because the purpose of the academic curriculum is to induct students into a body of knowledge within academic disciplines. In contrast, the purpose of a vocational curriculum is to induct students into a field of practice and the theoretical knowledge that underpins practise as the basis for integrating and synthesising each.

Wheelahan's (2015) notion of a VET curriculum addresses both practice and the theoretical knowledge underpinning practice. She critiques CBT for lacking applied disciplinary knowledge because it only gives students access to applications of knowledge that are specific to a context and "not to a system of meaning in which theoretical knowledge is embedded" (p. 759). She thus argues that under competency-based training, learning outcomes are derived from competence statement/standards associated with requirements and roles which prioritise procedural knowledge. In the above quote, she is foregrounding a knowledge-rich VET curriculum with applied theoretical knowledge related to practice in an occupation. Her work is particularly important for my argument in the next chapter, in which I contend that training for occupational practice requires a deeper understanding of how specialised knowledge and the social organisation of occupations underpins occupational capacity—the requirement for practice.

2.5 Concluding Discussion

Competency-based training prioritises the performance of tasks, with learning outcomes derived from standards and subsequently used to design curriculum content. The debate on outcomes-based qualifications using CBT approaches, characterised by learning outcomes and designed down curriculum content, is contentious and well documented. As the literature review in this chapter has sought to show, the extensive critique of CBT yields an important insight: the CBT focus on task performance-based and assessment-led curricula in vocational education and training fragments the learning process by excluding disciplinary knowledge. The next chapter focuses on developing a conceptual lens that considers specialised knowledge and the social organisation of occupations, to provider a richer understanding of training for occupational practice.

CHAPTER 3 OCCUPATIONS CONCEPTUAL WEB

3.1 Overview

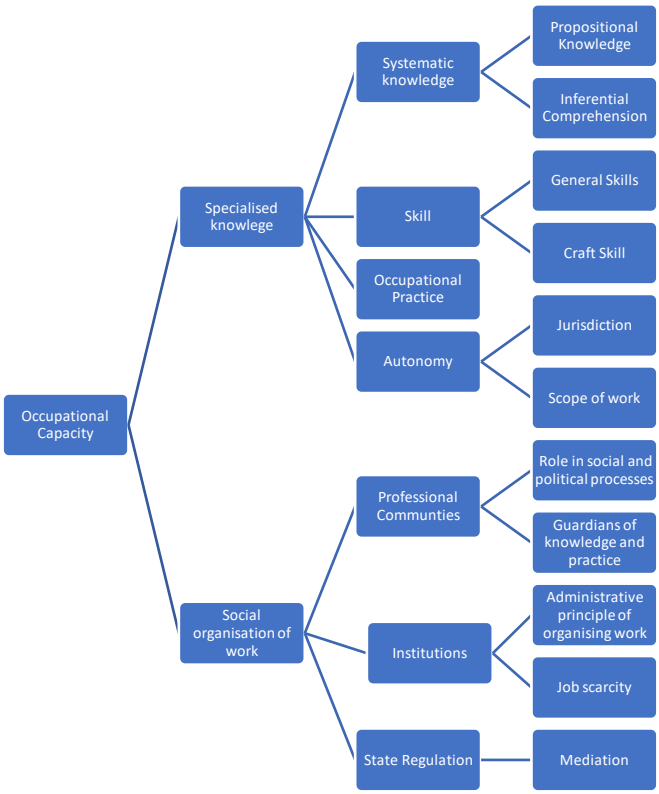
This chapter analyses the notions of occupation and occupational capacity. The analysis is based on the work of Abbott (1988, 1989), Freidson (1973, 2001), Standing, (2009) and Winch, (2010, 2013, 2014, 2015). The previous chapter detailed competency-based training approaches to deriving vocational qualifications and learning programmes, drawing out their focus on the performance of tasks as preparation for work as a fundamental weakness. This chapter theoretically develops the notion of occupational capacity, underpinned by specialised knowledge and the social organisation of occupations, as the requirement for expert practice. A strong theme running through the thesis is that the relationship between training and practice in occupations is subject to two forces: an internal force of specialised knowledge, which encapsulates systematically organised knowledge, occupational practice, skill, and autonomy; and an external force in the form of the social organisation of occupations by professional bodies, institutions, and the state. My conceptual analysis of specialised knowledge here lays the groundwork for Chapter 6, in which I use it to identify and analyse key aspects of the development of two occupational qualifications and their associated intended curricula: plumber and electrician. Similarly, I draw on the conceptual analysis in this chapter to analyse evidence of the role played by the social organisation of occupations, in shaping training for the plumber and electrician occupations later in Chapter 7.

Looking at the German vocational education system, Linda Clarke and Christopher Winch (2013) argue that occupational capacity is underpinned by a system of institutional relationships, state regulation, knowledge, and skills. In this chapter, I draw on their work to understand two broad concepts highlighted by them: first, specialised knowledge; and second, the social organisation of occupations. Specialised knowledge is the internal basis of an occupation, and as such, the foundation of occupational expertise. It focusses on four features of occupation: systematic knowledge, skills, occupational practice, and autonomy. In comparison, the social organisation of occupations focuses on the role of actors in professional communities, institutions, and state regulatory bodies, who externally shape occupational training and practice. I argue that understanding how specialised knowledge and the social organisation of occupations relate to each other provides greater insight into the occupational capacity underpinning expert practice. The conceptual development of occupational capacity in this chapter is in line with Freidson's (2001) view that understanding work requires comprehensive theorisation of work that goes beyond

tasks. Freidson argues that theorising about work must include the "set of interconnected institutions providing the economic support and social organisation that sustains the occupational control of work" (2001, p. 2). The conceptual web developed in this chapter emphasises the forces that can either enable or hinder or advance the training for and practice of an occupation.

The chapter draws on literature on both occupations and professions. While the term "occupation" is often used quite broadly in relation to the function of work in the economy (Standing, 2009; Winch, 2010), the term "profession", as explained by Freidson (2001, p. 12), is associated more with an organised occupation with the power to control the training, practice, and performance criteria for work. As Freidson (2001, p. 12) points out, very few occupations would meet the standards of being fully in control of their work in the English sense of the word "professions". Additionally, the use of the term "professions" to identify work associated with elite members of society can lead to a lack of clarity on types of labour performed by "workers" in trades related to non-elitist kinds of work (Freidson, 2001, p. 13). Freidson (2001) also observes that the differences between an occupation and a profession are not so significant and notes that his use of the term "profession" includes a notion of occupation. Following Freidson, my use of the term 'occupations' includes professions.

Figure 3.1 (p. 39) depicts the conceptual web of occupation, illustrating how various concepts relate to the central notion of occupational capacity; and serves as a point of reference for the organisation of the chapter. In developing the concept of occupational capacity, I am often referring to that which is developed in preparation for work in learning programmes requiring both education institutional and workplace training. Inherently, developing occupational capacity as a contrast to CBT raises questions about the structure of an occupational capacity-based curriculum. The focus of this research was to develop general principles to analyse occupational qualification development processes and intended curriculum (detailed explanation to follow in Chapter 3: methodology chapter), however, future research work that engages with the structure of occupational capacity-based curriculum could emerge from this thesis (detailed explanation to follow in Chapter 9 on Contributions). The next section kicks off the discussion with a closer look at the concept of occupational capacity and how it is used in this thesis.



3 Figure 3.1 Internal and External Dimensions Influencing the Development of Occupational Capacity

3.2 Occupational Capacity

Clarke et al.'s (2013) work on occupational capacity draws on David Marsden's (1999) book, *A theory of employment systems*. In this book, Marsden distinguishes between systems based on a production approach and those based on a training approach. A production approach sees skills as being work-based and firm-specific, and leads to training that is mostly defined by an individual employer and is specific to a job (Clarke et al., 2013, p. 933). In contrast, a training approach puts emphasis on a person's ability and a certified qualification (Clarke et al., 2013, p. 933), and on institutional regulation of training. Additionally, as Clarke et al. (2013, p. 933) explain, a training approach is typically based on an occupational labour market that is typically collectively and industrially organised. The difference between the two approaches is better understood in country-specific contexts.

Clarke et al. (2013) use Marsden's distinction in a comparison of labour markets in Germany and the UK. They describe how the German notion of occupation is based "on the principle of developing occupational capacity through negotiation and regulation by a range of stakeholders, including the social partners (trade unions and employers representatives) and educationalists" (2013, p. 933). In contrast, the UK has a trades-based skills system, in which trades are "defined

by skills attached to output and performance in the workplace", which follows Marsden's notion of a production approach to training (Clarke at al., 2013, p. 933). In the German context of occupational labour markets, the training approach contains the scope of activities, know-how, knowledge, and competences, as well as the value of the associated qualifications, which can vary substantially within different industrial relations systems (Clarke et al., 2013, pp. 933–934).

Clarke et al. argue that occupational capacity is concerned with a broad notion of know-how, understood in terms of "ability based on some permutation of dexterity, practical knowledge, theoretical knowledge and social ability" (2013, p. 935). As they (2013, p. 935) explain,

> "occupational know-how" goes beyond mastery of a technique related to task performance and extends to a grasp of the requirements of the occupation as a whole, including the carrying out of extended projects and specification of the broader context into which individual tasks are integrated.

From Clarke et al.'s (2013) work, I draw out two broad concepts—specialised knowledge and social organisation of occupations—to further explicate their notion of occupational capacity as it is enacted in expert practice. Occupational capacity is a dynamic concept that can modify how training and practice relate to each other in an occupation. In outlining concepts under the internal force of specialised knowledge and external force of social organisation of occupations, I am explaining the themes that organise the data and subsequent analysis to explain the development of occupational capacity or its lack thereof. Additionally, I am developing general principles for developing occupational capacity in a learning programme to attempt a contrast to learning outcomes and design down approaches in CBT. For example, later on, in Chapter 7, I present evidence that shows how work conditions can affect the development of certain types of knowledge in workplace training. Alongside the evidence, there is analysis of how production priorities in the workplace change the dynamics of the relationship between master craftsman and apprentice. Developing the notion of occupational capacity helps to show that when thinking about qualifications and preparation for occupational practice, it is important to consider two dimensions that shape occupations: knowledge and expertise, and the social organisation of occupations. In the next section, I explain specialised knowledge as the basis of an occupation.

3.3 Specialised Knowledge

There is agreement, to some extent, on the relationship between occupation and knowledge among scholars from different disciplines. Theorists of political economy, sociology of work, and philosophy of education agree that occupations often identify with bodies of abstract and practical knowledge (Abbott, 1988; Freidson, 2001; Standing, 2009; Winch, 2010). Standing explains that occupations involve "some combination of forms of knowledge that go beyond conventional notions of skill – abstract, technical, inferential and procedural" (2009, p. 11). Similarly, Freidson argues that any type of work presupposes knowledge, and that the "social and economic organisation of practice plays a critical role in determining both what knowledge can be employed in work and how knowledge can be exercised" (2001, p. 27). Though agreement exists on the importance of knowledge for occupational practice, there is contestation over what kind of knowledge best prepares for work and provides jurisdiction and power.

In understanding specialised knowledge, I draw on how Winch (2010)—in work done prior to his collaboration with Clarke et al. (2013)—bases occupational capacity on two kinds of knowledge: know-that (often in the form of subject knowledge) and know-how (dependent on know-that, and often in the form of practical knowledge). Winch's work also draws attention to the need for vocational training educators to consider how occupational capacity is developed in training both in the education institution and at the workplace. His analysis of knowledge types shows the importance of including both know-that and know-how in occupation-oriented training. Winch's work stands in contrast to competency-based training approaches, which assume that the performance of work tasks indicates possession of the required knowledge and ability for occupational practice. His more nuanced development of know-that and know-how provides insight into the complex relationship between bodies of knowledge and skill that plays out in expert practice.

Winch's (2010, p. 144) notion of occupational capacity is drawn from the German context. For him (2010, p. 52), occupational capacity can be best illustrated using an example, specifically a carpenter's skill. Winch (2010, p. 52)observes that a carpenter's skill often refers to a collection of skills, and not to the general skill of a carpenter. The notable variation arises when discussing a proficient carpenter who integrates the skills in practice, which, for Winch (2010, p. 52), is occupational capacity. In the context of training, the opposite of developing occupational capacity would be developing skills described only through the performance of narrowly defined tasks. In

what follows I explain the four key concepts which I consider to be instrumental to the internal force of an occupation: systematic knowledge, skill, occupational practice, and autonomy.

3.3.1 Systematically Organised Knowledge

Winch (2015, p. 172) argues that an individual must possess systematically organised knowledge to exercise professional judgement and to justify their actions in the course of decision-making in an occupation. Drawing on the German context, he (2010) identifies two kinds of propositional knowledge within a body of knowledge : *kenntnis* and *wissen*. *Kenntnis* refers to contingent knowledge and discrete propositional knowledge; while *wissen* refers to organised propositional knowledge, commonly referred to in English as scientific and theoretical knowledge (Winch, 2010, p. 103). It is possible to attribute *kenntnis* and even *wissen* to an artisan based on their activity in the workplace. *Wissen* is associated with practice because relevant systematic knowledge is required for professional action to be successful (Winch, 2010, p. 103). *Wissen* is also essential for providing evidence of professional judgement in the workplace, as a requirement for learning practical knowledge that consists of assessing, performing, and justifying professional action in relevant situations (Winch, 2010, p. 104). It is important to note that in Winch's notion of occupational capacity, professional judgement (and its development thereof) is based on several types of knowledge working together. These knowledge types include practical knowledge, knowledge by acquaintance, and disciplinary knowledge.

To grasp the roles of *kenntnis* and *wissen* in the professional curriculum, Winch (2013) turns to the work of Robert Brandom to explain the role of inferentialism in understanding subject matter. Winch uses inferentialism to show connections between bodies of knowledge in systematically organised knowledge and their relationship to know-how in practice. Brandom, as explained by Winch, posits that in order to understand and apply concepts based on related propositions, such as in a systematic body of knowledge, an individual requires an understanding of the inferences that can be made from propositions that use the concept (Winch, 2013, p. 130). Brandom thus suggests that even though knowledge by acquaintance is one way of grasping a situation—i.e. an aspect described by a proposition—it can only go so far as justifying one's genuine belief in the proposition and is not sufficient to justify practice (Winch, 2013, p. 130). Furthermore, Brandom's position, Winch argues, leads to the conclusion that one cannot know a proposition unless one understands the inference of the proposition (Winch, 2013, p. 130). The implication is that knowledge does not consist of isolated propositions but is found within a conceptual structure

comprised of other related concepts (Winch, 2013, p. 130). Winch is emphasising that inferentialism within a systematic body of knowledge (know-that) is key to having a nuanced understanding of professional judgment in expert practice.

In Winch's work, there is a relationship between inferential comprehension and know-how. Engaging with know-how requires an acknowledgement, on some level, of rules and an exercise of agency for carrying out actions. Explanations of know-how can be very detailed. For Winch (2006, p. 414), inferential comprehension or understanding relations between different propositions is a form of practical knowledge. This kind of knowledge is difficult to develop through formulaic methods as it is not only derived from theory but is also context-dependent (Winch, 2006, p. 408). A broader view of the role of practical knowledge is required to understand inferential comprehension because it is a way of knowing how that goes beyond being a version of rule-following (in the performance of a task). An informed definition of applying a technique requires reasoning and intentionality, which lead to a sound professional judgement.

In considering the development of occupational capacity, Winch explains that Brandom's work further suggests that propositional knowledge is often found within academic subjects, which are located within broader disciplinary knowledge. This implies that propositions are inherently interrelated within the conceptual make-up of disciplinary knowledge structures (Winch, 2010, p. 112). i.e. a proposition inevitably does not stand alone but is often part of a chain and joined up with other propositions (Winch, 2010, p. 112). A student who gains knowledge in a discipline will learn the propositions and also understand how they relate to each other (Winch, 2010, p. 112). Understanding relationships between propositions leads to an inferential ability in students that reveals their level of expertise (Winch, 2010, p. 113). Inferential ability in students thus builds the foundation for professional activities, which are based on systematically organised knowledge.

The implication of Winch's use of Brandom's work is that the development of inferential comprehension in trade-based occupations requires a learning programme which includes theoretical and practical knowledge (context specific but also inferential comprehension) in classrooms and workplaces, respectively. Learning sets of propositions that are only related to a task can be problematic from the point of view of gaining the ability to make inferences from subject matter found in systematically organised knowledge and thus to apply general principles, conceptual relationships, and central propositions within a subject (Winch, 2015, p. 172). Applying Winch's notion of occupational capacity to the requirements for learning programmes reflects a

deeper understanding of inferential comprehension, as the relationship between know-that and know-how is one which goes beyond only what is 'relevant' to the performance of work tasks.

3.3.2 Skill

Specialised knowledge embraces skill. Skill refers to the ability to perform a task, solve problems based on expert knowledge, and engage in social relationships that enable performance (Clarke & Winch, 2006, p. 256). Clark and Winch (2006) highlight the different characteristics of skill, such as technical abilities, social attributes, and behavioural and cognitive abilities. While Clark and Winch (2006) provide a broad understanding of skill, in this section, I draw on Streeck's (2012) work on craft skills and general skills during the Industrial Age. His account of craft skills and general skills development in skills formation systems shows how different types of skills were closely linked, and also provides insight into how different actors advocated and negotiated for skills development in line with their own agendas. My interest here lies in what the agendas of actors mean for understanding occupational capacity. Later, in Chapter 7, I use the insights gained from Streeck's work to understand how different actors might advocate for certain skills in the development of an intended national curricula (a version of specialised knowledge) using the regulatory templates informed by the goals of policymakers.

Streeck (2012, p. 319) shows how craft skills and general skills were influenced by relationships and conflicts among trade unions, employers, and workers in the German and Anglo-Saxon skills formation systems. Craft skills were valued as advanced skills during the Industrial Age, but they could be narrow, specific high-level skills (Streeck, 2012, p. 319). These high-level skills were associated with knowledge in a particular field, which often included mastery in the use of equipment found in different workplaces (Streeck, 2012, p. 319). In contrast, general skills were unspecific but were widely used in industry and needed manual or physical labour (Streeck, 2012, p. 319). Streeck (2012) shows that in the Anglo-Saxon and German contexts, industry demanded different combinations of craft skills and general skills. His work provides some insights into how changes in skill demands are related to contextual factors, such as mass production and changes in technology, in a specific setting.

Streeck (2012) explains how, in the Anglo-Saxon environment, trade unions controlled skilled labour supply and wages. Trade unions held significant bargaining power and control over what work their members performed and how it was valued. If a trade union's members had to learn to

use new machines, higher wages were often demanded to learn the new skill (Streeck, 2012, p. 320). This system, in which trade unions-controlled wages based on specific skill types, became unmanageable for industry, as it clashed with the latter's need to introduce new machinery for mass production to remain competitive (Streeck, 2012, p. 320). As Streeck (2012) explains, problems erupted because employers refused to meet the workers' demands for higher pay. The result was that to avoid dealing with the issue of wages, industries pushed instead for automated factories (Streeck, 2012, p. 320). The Anglo-Saxon case points to the complexity of defining skills in a context where interactions between industry, trade unions, and economic interests influence demand for certain skills.

The German system, meanwhile, had highly skilled workers, which allowed employers to deploy new technology rapidly. Streeck (2012) describes the German workers as having both advanced specialised and general skills due to widely accessible and publicly supervised apprenticeships. There was an ample supply of skilled industrial workers in Germany during the Industrial Age, which supported the easy retention and redeployment of workers (who were also highly mobile in external labour markets) while allowing workers to engage quickly with new technologies that added a competitive advantage to their industries (Streeck, 2012, p. 321). As Streeck (2012, p. 319) explains, employers in the German system were willing to invest large amounts of money in the development of skills. The trade unions supported companies' upskilling employees for their benefit while simultaneously pushing for more general training for their members (Streeck, 2012, p. 319). It is important to note that crucial role-players in the German context prioritised both high-level skills and general skills, which gave German industries a unique competitive advantage.

Streeck's (2012) descriptions of the Anglo-Saxon and German social and economic systems show how context influences skills development. Streeck (2012, p. 319) explains that in contrast to the German system, the roles of collective bargaining and wage-setting were performed separately by each stakeholder in the Anglo-Saxon context. He argues that the most notable characteristic of the German system was the joint regulation of the vocational training system at the industry level. The joint regulation meant that collective bargaining and wage-setting were done by trade unions and employer associations, who jointly administered a set of rules and were licensed by the state. External pressures, such as mass production and bargaining power for wages, influence which skills are valued and the extent to which they are demanded. The connection between the demand for different skills—i.e. workers with high-level and general skills versus less-skilled labour in automated factories—inevitably has an impact on the required types of knowledge for practice in

the workplace. However, Streeck's detailed account of skills in the Anglo-Saxon and German contexts during the Industrial Age suggests that power relations and specific collective bargaining effect skills formation. From this, it could be inferred that the same occupation in different contexts might draw on different combinations of craft skills and general skills for practice. The result is that the composition of specialised knowledge found in training for an occupational practice may vary due to context.

3.3.3 Occupational Practice

In the previous chapter, I explained how CBT's focus on task performance was problematic due to how it compromised knowledge. This section further explains how specialised knowledge is compromised when trying to differentiate knowledge types through observation of practice. The problems experienced when differentiating knowledge types have similarities to those experienced when using the task-based approach to training that can directly affect the specialised knowledge in curriculum contents. I have earlier alluded to this issue, in Chapter 1 Section 1.4 (p. 11), when describing Muller's (2009) critique of previous South African vocational training programmes for containing "contextually tacit procedural knowledge". Here I turn to Jim Hordern (2016), who uses the work of Winch (2010, 2014) and Michael Young and Johan Muller (2014) and provides a compelling argument for extending the differentiation of occupationally related knowledge to consideration of occupational practice. Particularly useful in this regard is Hordern's investigation into forms of occupational practice differentiated based on their underpinning knowledge and institutional conditions that shape knowledge. Importantly, in terms of the analysis in this thesis, this section identifies the difficulties in moving from observation of occupational practice to the development of curriculum content for training for practice.

Hordern (2016, p. 1) establishes that understanding the nature of occupational expertise requires differentiating the structure and purpose of types of knowledge. He (2016, p. 4) argues that occupational practice requires a knowledge base assembled from education institutions and the workplace. Both education institutions and the workplace expose novice practitioners to a wide range of curricula, and pedagogic and workplace representations of specialised and non-specialised knowledge. Hordern (2016, p. 6) draws the two types of specialised knowledge identified by Young and Muller (2014)—"conceptual generality and contextual purpose"—into the discussion on occupational practice. While the "conceptual generality type is related to the conceptual development to be found in academic disciplines, the contextual purpose type is located in

occupation-oriented disciplines" (Hordern, 2016, p. 6). What Young and Muller's (2014) work highlights is that conceptual development within the broad discipline and contextual purpose within the occupation-specific discipline work together to form the specialised knowledge that underpins expert practice.

Hordern (2016, p. 10) emphasises the importance of understanding context in occupation-oriented disciplines but cautions against understanding specialised knowledge only in the context of judgement and actions which are "situated" or highly contextual to an observer (Hordern, 2016, p. 10). He (2016) argues that judgements and actions are products of a broader framework of reasoning that guides decision-making and action-taking in an occupation. Similar to Winch's explanation of propositions in systematically organised knowledge (discussed earlier in Section 3.3.1 p. 42), Hordern emphasises the link between bodies of knowledge and occupational expertise through which there is often access to the conceptual resources that underpin how practitioners think through problems encountered in their practice and how they think through alternatives and reject inappropriate solutions (Hordern, 2016). The implication is that breaking tasks down into actions associated with performance criteria is not a full representation of occupational practice for training.

Here, I am using Hordern's (2016, p. 2) work to argue that when training is focused on situated knowledge for tasks in the workplace, the disciplinary knowledge required for occupational practice is undermined. The likely consequence is that systematically organised knowledge (knowledge based on a body of facts or truths that is organised to reflect general laws or build concepts) becomes less critical for the curriculum (Hordern, 2016, p. 2). Therefore, Hordern's work supports my argument that the types of knowledge enacted in occupational practice are not easily discerned through competency-based training. The problem lies in identifying the systematically organised disciplinary knowledge that is enacted in occupational practice. Hordern (2016, p. 10) argues that systematically organised disciplinary knowledge provides enhanced technical and situated capability, which is essential for occupational practice. In the following section, I examine how knowledge validates autonomy and control of practice in occupations. The role of knowledge within a broader conceptualisation of occupation is enhanced by understanding how a professional is limited or enabled by certain boundaries in practice by specialised knowledge.

3.3.4 Autonomy

The professional/occupational practitioner who is empowered to practice in an occupation requires a means of legitimation that convinces the general public. As I discuss in this section, examples of legitimacy to practice can come from qualification or work-based learning programmes regulated by the state or professional bodies, or a combination thereof. Additionally, as Freidson writes, authority to practice in a particular area "is based not on economic or administrative status but rather on the content and character of its expertise and the functional relationship of that expertise" (2001, p. 56). According to Freidson (1973), professionalisation means that members of the occupation have attained exclusive competence and can control their scope of work. He explains that professional work includes elements of autonomy and self-control. Authority to practice has a strong relationship to the specialised knowledge found in a distinct kind of work practice. While autonomous practice draws on specialised knowledge to justify the scope of work, professional bodies must at the same time navigate social and political processes to secure the right to practice autonomously. Thus, aspects of autonomy are covered under both specialised knowledge and the social organisation of work.

By associating distinct expert practice to specialised knowledge in the social organisation of occupations, the professional/occupational practitioner can legitimise their practice in the public domain. Control over the scope of work is often defined by a professional community central to determining the organisation of an occupation. Freidson (2001) highlights that control over occupational practice can be exerted in two ways in an ideal type of profession. It is reflected, first, in the extent to which a professional has control over their scope of work, and second, in the extent to which they have discretion in applying their knowledge to the work. The latter is related to the division of work among a group of professionals, where the profession has control over the labour process. Both elements of autonomous practice draw on the social organisation and structure of specialised knowledge in relation to the division of labour, wherein professionals under an occupational structure can perform and apply knowledge in their scope of work.

As I discuss later, in Section 3.4.1 (p. 51), the ability to establish and advance an occupation lies with members of professional communities and is subject to state regulation and labour market dynamics. There is often consensus that professional work needs to identify with bodies of abstract knowledge (Freidson, 2001; Standing, 2009). Such bodies of knowledge enable professional communities to defend or advance their domain of influence and to create a validated source of

required knowledge to respond to the changing nature of the professional practice (Freidson, 2001; Standing, 2009). Hordern (2014, p. 2) argues for the importance of a community of professionals to legitimise the specialised body of knowledge related to their work, where they are tasked with recognising and validating knowledge. As I discuss below, in Section 3.4.1 (p. 51), the process of identifying knowledge and validating it for use within a professional community enables control over work and autonomy in practice for the professional.

In conclusion, specialised knowledge is the internal force which shapes preparation for occupational capacity and thus expert practice. In conceptualising specialised knowledge, I have raised some complicated issues such as the cultural context of skills, different types of knowledge, and the application of knowledge in practice, as well as the essential role of knowledge in relation to autonomy in practice. As discussed earlier, Winch's notion of occupational capacity foregrounds the relationship between know-that and know-how, provides a more holistic view of knowledge, and lays out a broad conceptualisation of occupation. The notion of skill helps us understand the influence of contextual factors on the structure of work, which prioritises varying combinations of craft skills and general skills. In the discussion on occupational practice, I reflected on combinations of knowledge types that are enacted in practice, while noting how observation of practice is a difficult starting point to differentiate the various knowledge types that combine into specialised knowledge. The notion of autonomy further reflects the centrality of specialised knowledge, which is the basis for expert practice and provides enclosures for the scope and jurisdiction of work. In the next section, I turn to the external force which shapes preparation for occupational capacity—i.e. the social organisation of occupations in which knowledge and practice are located.

3.4 Social Organisation of Occupations

Whereas in the previous section I presented an analysis of knowledge which suggests that task-based curricula are problematic, in this section I show that occupational capacity is shaped by social factors as an external force that can either strengthen or weaken occupational practice and training. The theoretical discussion here leans towards outlining the characteristics and roles of various actors in society that strengthen occupations. It also reflects on the network of relationships that can exist between these actors who influence occupational practice and training. Later in the thesis, in Chapter 7, I test and analyse the social organisation of occupations in my empirical research.

There are various social factors that shape preparation for occupational capacity. Standing (2009, p. 12) identifies occupations as part of a society in which their functions reproduce economic and social relations in the broader community. He defines an occupation as an "evolving set of related tasks based on traditions and accumulated knowledge, part of which is unique" (Standing, 2009, p. 11). Standing's (2009) work implies that the meaning of an occupation is inextricably tied to its social functions in a specific context. In this section, I now examine how actors in professional communities, institutions, and the state influence training and practice.

There are two reoccurring ideas in the social organisation of occupations. First, the professional/occupational practitioner has certain rights which are won by them and afforded to them through different kinds of social struggle. (Standing, 2009, p. 11) highlights rights such as a monopoly of practice, a structure of public payments, setting of work procedures, creation of regulations, control of recruitment and training, and licensing of practitioners. Second, society is dynamic and often changing, and this can affect the relationship between education and work embodied in training.

Occupations were often established, and have since evolved, amid power relationships, social pressures, and economic changes (Standing, 2009). The question that then arises is: how does an occupation gain power to practice in society? Freidson's (1973, pp. 17–38) earlier work provides some insight in this regard. He argues that occupations, or more specifically professional bodies, gain power by being able to license and mandate their members, which provides legal authority to their members to recruit, train, and examine the ranks of the occupation (Freidson, 1973, p. 29). He further explains how continuous political activity is required to maintain a profession's position, which can further improve its place in the market and also affect the division of labour within the profession (Freidson, 1973, p. 29). As mentioned earlier in the discussion on autonomy under specialised knowledge, in Section 3.3.4 (p. 48), Freidson's (1973) argument underscores the point that a crucial part of the authority to practice as an expert among professionals/occupational practitioners is their claim to specialised knowledge, but another crucial part is professional bodies' navigation of social and political process to establish their right (i.e. their members' right) to practice certain work.

It is worth noting here that Freidson (1973) also explains that power dynamics in society can unfairly favour a group of people who influence social and political processes. In the case of South

Africa, Christie's (1997) explanation of the regulation of trade-based occupations by the apartheid government, which reserved skilled labour for white workers through various legislative processes—discussed earlier in Chapter 1 Section 1.1 (p. 6) is a clear reflection of such unfair power dynamics at play. Similarly, Standing too notes that the dichotomy between professions and crafts may reflect "little more than artificial deference of privilege and occupational domination that exists in a particular society" (2009, p. 24). In so doing, he is highlighting that the power of occupations and the (esteemed) place they occupy in society may not relate to expertise but to how privilege manifests in a particular context.

Historically, occupations and work have moved from being defined by self-governing guilds in the medieval period to being defined by industry and employers during the Industrial Revolution, and then to being influenced in a more nuanced manner by the state and international organisations in the modern era (Abbott, 1989; Freidson, 2001). What follows is a discussion on how professional bodies, institutions, and the state have historically played a role in occupation formation, establishment, and maintenance—which provides insights into the types and consequences of the social organisation of occupations.

3.4.1 Professional Bodies/Occupational Communities

The stability of an occupation in a society can be associated with particular characteristics of professional communities. Standing (2009, p. 19) shows that an established occupation is rooted in a community in which the work of individuals is self-monitored and self-evaluated, and the 'self' extends to one's chosen peers. Professional community members can collectively bargain, lobby, and exercise collective practitioner control through training barriers such as entrance exams, licenses, and ethics codes (Standing, 2009, pp. 19–20). Standing shows that communities of practitioners able to exercise jurisdiction or monopoly of practice (such as guilds) have the power to determine a structure of payments, work procedures for practitioners, regulations, recruitment, training, and licensing controls (Standing, 2009, p. 25). He highlights ways in which professional communities justify their expertise and how they secure the exclusive right to practice particular kinds of work. A large part of justifying their expertise is their strong association to a form of specialised knowledge that underpins their recognised practice in society (internal force), as discussed earlier in Section 3.3.4 (p. 48). However, understanding the characteristics of professional bodies in terms of the social organisation of occupations requires examining their historical emergence, to which I now turn in this section.

I start by looking at medieval guilds, drawing mainly on Standing (2009) here. Medieval guilds held historical, economic, and social dominance through centuries (Standing, 2009, p. 15). They had notably more power in society than most professional bodies do today. Guilds gave their members status and identity within a community. There were guilds for bankers; wool, silk, and cloth merchants; and many others. Guilds set up the framework of training for their members, maintained the status of the occupation, created buffers for entry and exit out of the occupation, and facilitated the market under which these occupations functioned (Standing, 2009, p. 22). Guilds typically operated on the basis of an hierarchy that consisted of master craftsmen, journeymen, and apprentices (Standing, 2009, p. 15). Master craftsmen owned equipment and places of work, and employed journeymen on short-term contracts. Journeymen typically worked and waited to become master craftsmen. They depended on the assets and openings allowed by master craftsmen.

During the medieval period, occupations could be found in guilds similar to modern professional bodies/occupational communities. Standing (2009, p. 15) describes guilds as self-governing, where a hierarchical community was built to perform certain kinds of work and training. He draws similarities between medieval guilds and modern-day occupational communities as groups of people engaged in the same work, who often share values, norms, and perspectives that extend beyond work-related matters (Standing, 2009, p. 15). Additionally, they share tasks, rituals, standards of behaviour, and work codes (Standing, 2009, p. 15). In contrast, Abbott (1989, p. 275) critiques the idea of occupations as a social group in modern times, as it implies communication within this group in which there is a social and cultural understanding that comes from openness around the same kind of work. He notes that there might have been a social group of professionals in early modern society, but that it rarely exists today (Abbott, 1989, p. 275). Considering Standing's (2009) and Abbott's (1989) insights into professional communities today, it is important to understand the functions of professional bodies, which are often located within a specific training and practice context but which in modern times can draw from international practice in an occupation in complex ways. From the viewpoint of this thesis, their work is particularly important in identifying how education policy regulation in South Africa draws on international standards of training and practice from other professional bodies in particular occupations in developed countries.

Power dynamics dominated the functioning of medieval guilds. Freidson (2001) and Standing (2009) show that guilds had strong associations with the elite, which enabled them to yield significant power to rule in their own interests in society. Freidson (2001, p. 32) explains that a guild's connections to elite classes created power relationships that determined the occupation's position in society. He further reflects on how the rise of powerful guilds created power dynamics that could be harmful to society and often required some form of regulation. However, a reflection on guilds also reveals how professional communities can provide stability for an occupation within a society, which can ultimately benefit society. While a separate and extensive literature review on power dynamics is beyond the focus of this research study, the paragraph serves to acknowledge that power dynamics as part of larger political and economic society narratives and I refer briefly on power dynamics throughout this section.

Whether though power dynamics in collective social processes or hierarchical structures, professional bodies first require some claim to expertise in a particular area of practice which is often based in specialised knowledge. The importance of occupational communities in stabilising practice through knowledge and agreement among peers cannot be overstated. Hordern (2016, p. 456) explains that communities establish and strengthen the definitions of work behaviours, procedures, and practice based on the knowledge base of the occupation, both in terms of the specialised and non-specialised knowledge of the occupation. Freidson (2001, pp. 201–202) argues that the process of establishing formal knowledge associated with an occupation assists in identifying the jurisdictional boundaries which create and maintain a coherent body of knowledge as a discipline. A critical component of developing a specialised body of formal knowledge and skills is a group of like-minded people who can learn and practice it (Freidson, 2001, p. 202). The group will recognise each other as colleagues due to similar training and experience, and identify each other through specific tasks, techniques, and work problems that often give rise to debates (Freidson, 2001, p. 202). The importance of an occupation-associated community lies in it being able to provide the stability to identify, strengthen, and advance the occupation and enable careful consideration of the training of future practitioners.

In concluding this discussion on professional communities, I return to Standing's (2009) and Abbott's (1989) contrasting views, which show that identifying the characteristics of professional communities can be complex in modern times, especially when determining practice and training nationally in the context of an increasingly globalised agenda. The complexity lies in how our understanding of professional bodies possibly draws on the medieval guilds that often functioned

in a local area. Today, individuals who perform particular kinds of work can be difficult to locate in a professional community in the national or global context, especially in occupations that are not regulated. Despite this modern challenge, an active professional community, whether located locally or nationally, can establish and maintain an occupation's position in a society. This section has sought to highlight the power that an occupational/professional body can hold over various aspects of the occupation, from training to types of work to salary setting. But how the professional body can shape the occupation in a local or national context is subject to other forces in society, such as institutions and the state, as well as international concerns. A professional community can enable, or potentially hinder, practitioners in navigating social norms and forces that are context-specific in terms of both occupational training and practice.

3.4.2 Institutions (Organisations/Non-Governmental Organisations/Government Departments)

The previous section explained how professional bodies support occupational practice and training by working within social and political processes to establish their claim to practice certain types of work. Professional bodies often must navigate institutional arrangements in the socio-political landscape, where economic and public welfare agendas can affect occupational training and practice. In this section, I use 'institution' as a generic term for any organisation that seeks to shape occupations according to its own agenda, whether that be the production of goods, public services, philanthropy, or education. Here, scholarly work mostly centres on how production concerns in the Industrial Age shaped occupations in organisations as this (production) is the example that best illustrates how organisations could shape occupations for their agenda. However, understanding how institutions can shape occupations in general is the point that I draw out for use in the data analysis later. This section thus explains how institutional arrangements influence occupations by examining how such arrangements emerged historically.

Changes to medieval guilds and the structure of work occurred at the start of the Industrial Revolution in the 18th century. Freidson (1973, p. 20) explains that changes to production led to a transformation of occupations during the Industrial Revolution. Historically, products were made by highly skilled craftsmen. In contrast, during the Industrial Revolution, unskilled labour used machines to perform certain parts of a production process (Freidson, 1973, p. 20). The change in production processes led to, according to Abbott (1989, p. 275)an overarching change in the nature of work—it created a new division of labour based on organisational structure. Similar to Abbott, Freidson (1973, p. 20) argues that occupations defined by organisational

structures came to embody an administrative principle of organising work. But this administrative principle of structuring and controlling work did not fully capture the government regulation of work and organisations, industrial trade unions, and their structure of work related to the economy and other terms and conditions of work (Freidson, 1973, p. 21). Abbott (1989) and Freidson, (1973) thus separately argue that the Industrial Revolution made production-related concerns in the organisational structure of a company or industry central to defining occupations. The administrative principle of organising work that they describe is in line with Freidson's (2001) definition of the bureaucratic division of labour.

Freidson's (1973) earlier work further reflects on occupations that are defined by industries or companies through the administrative principle of organising work. He (1973, p. 20) describes how a company's management formulates a plan with detailed instructions for what and how work occurs, where the worker requires a general skill level and has an administratively created job title in the organisation. However, this administrative job title provides no occupational identity and can be dissolved and remade as skills are general and created relative to consumer demand (Freidson, 1973, p. 20). Moreover, consumption-related production requires flexibility in organisations to respond to the market and often calls for a high turnover of staff (Freidson, 1973, p. 280). And, as Abbott (1989, p. 276) explains, occupations are difficult to understand when there is a high turnover of staff and careers are more fluid in response to the requirements related to production. Occupations defined by an organisation are firm-specific, making it difficult for individuals to move around in the labour market. The difficulty lies in occupational formation driven by organisational structures—this is more likely to reflect the intentions of the organisation rather than the interplay of relationships between state, employers, educators, and professional bodies in an occupational labour market. Understanding how organisational agendas driven by production priorities can shape an occupation raises questions about how professional bodies and the state respond to foreground their agendas (the main theme in this section). By explaining how these agendas play out in relation to each other in the social organisation of occupations, I am laying the groundwork for identifying how these agendas play out in reforms such as the occupational qualifications policy.

Between the logic of occupations based on the organisational structure of work and the logic of an occupational labour market, there is much variation in how occupations are influenced by structures in institutions for work alongside social and economic processes. Freidson's (1973) explanation of the administrative principle of organising work is that occupations draw their

meaning from work as part of a production process, which can be unstable for occupations because institutional agendas change. In contrast, an occupation can draw on a unique identity related to specialised knowledge and practice supported by a professional community in an occupational labour market. In drawing out the contrast, I am arguing that there are implications for occupations in the varied ways in which they are socially organised. For example, the instability of occupations can lead to other problems in society, such as job scarcity Brown et al., (2020). In some ways, occupational training and practice based on the administrative principle of organising work could seem extreme in a work context, especially considering how work today is different from the Industrial Age embodiment of the structure of work. However, in analysing the data in this thesis, I consider Freidson's discussion on the administrative principle of organising work to be similar to education policy reforms that prioritise employers' needs as the most important factor in defining training for work readiness. Additionally, as the previous section highlighted, professional bodies cannot ignore institutional arrangements and their meaning for training and practice because occupational practice functions within institutional arrangements. Thus, it is important to understand how these actors' agendas in the social organisation of occupations potentially influence occupational capacity both for training and for practice.

3.4.3 State Regulation

Broadly, state regulation of occupations can have far-reaching effects on the kind of expertise developed within training systems. By locating state regulation under the social organisation of occupations, it is implied that the state functions within a specific context with institutions and professional bodies. More specifically, Abbott (1988), Freidson (2001), and Standing (2009) show that state regulation occurs within the power dynamics between the agendas of various actors. In this section, I draw on these scholars' work to identify how state regulation can either function as a mediator between actors to reach the best possible outcome for all or play a domineering role by placing the agendas of certain actors before those of others. It is more likely to be the case that state regulation is neither solely domineering nor solely mediatory but a combination of the two; however, the distinction assists in the data analysis later.

Before discussing the role of the state though, there is a need to understand how the state regulates. Standing (2009) explains that the state typically regulates in three ways. First, occupational licensing is related to quality assurance of licensing that allows a certain number of members who meet the required standards to practice and includes the number of licenses, limiting the number of

practitioners or changing qualification standards to exclude practitioners (Standing, 2009, p. 190). Second, negative licensing, used in the disqualification of members from practising, is based on breaking the rules associated with the competence standards of an occupation (Standing, 2009, p. 195). Third, occupational accreditation or certification validates an individual to practice upon passing specific exams and meeting other conditions.

Regulation can become a contentious issue, as too much or too little regulation affects the occupations found in the economy and society. Standing (2009, p. 180) shows that any regulation can cause labour market rigidities, such as barriers to entry into occupations and licensed practice. He explains how some may perceive state regulation and self-regulation as limiting the right to work and hindering the working of an idealised free-market society in which supply and demand provide the balance for markets (Standing, 2009, p. 180). However, he also explains how others see the state regulation and self-regulation of occupations as protecting people in the occupations and communities from potential abuse (Standing, 2009, p. 180). Abbott (1989) also argues that occupational regulation can allow the state, which may not always act in the public's best interests, to shape an occupation to benefit a particular group of people in a society. Therefore, state regulation can protect the public in the realms of both the economy and public utilities.

In line with protecting public interest, Standing (2009, p. 181) specifies four reasons for the state regulation of occupations. First, there is a need to limit market power to prevent monopolistic practices that would raise the prices of goods and services. Second, it is essential that the product or service information provided is fair, and consumers have as much reliable information as do sellers. Third, there is a need to mitigate any adverse outcomes for a third party in cases when transactions between buyers and sellers can affect a third party. Fourth, some social objectives and outcomes fall outside the occupation, and this requires consideration of different ways of practising and pricing. Standing (2009, p. 181)recommends that when considering regulation, four questions must be asked: whom, by whom, over what, and by what means?

Abbott (1989, p. 287) similarly recommends asking three critical questions to identify state priorities in regulating occupations:

- Does the state favour organisational dominance?
- Does the state listen to categorical groups?
- How and why does the state utilise and control staffing structure?

According to Abbott (1989), these questions provide insight into the use of state power to create hierarchy and competition between occupations. Asking these questions is particularly important in the South African context due to the legacy of power dynamics inherited from the apartheid era that support unfair, race-based access to education and the labour market today—and which thus require state regulation.

In analysing the social organisation of occupations (the external force which shapes preparation for occupational capacity), I have looked at professional communities, institutions, and the regulative role of the state. I have traced professional communities to industrial guilds to show that they are committed to establishing, maintaining, and advancing an occupation's status for their members. Institutions using an administrative organisation of work based on their own agendas, can lead to occupational formation that is narrow and firm-specific, which could cause other problems in society, such as job scarcity. The state, as an overarching body, typically influences an occupation through regulation in forms such as occupational licensing for entry into the occupation, negative licensing for removal of practitioners, and accreditation of training for entry into the occupation. By identifying the social organisation of occupations as one of two broad concepts that make up occupational capacity, I am foregrounding an important point that permeates the established literature: training and practice are embedded in and shaped by relationships between professional communities, institutions, and the state. I am arguing that the development of occupational capacity, as a requirement for practice, must consider how the relationships within a specific context either enable or constrain occupational expertise.

The idea of the social organisation of occupations is important for understanding how using a task-based definition of work in training for practice is unlikely to consider the social factors that are required for the development of occupational capacity. I am suggesting that occupational qualifications and their associated curricula require a contextual grounding that goes beyond a focus on what work tasks are performed. The discussion on professional bodies, institutions, and state regulation here provides themes to understand how state regulation embodies an understanding of employer requirements which at times contrasts with (electrician and plumber) occupational experts' reflections on developing occupational qualifications and their associated intended curricula—as I show empirically later. In the data analysis in Chapter 7 the contrasts and similarities in how the different actors engage with the process and in what they foreground as representatives of professional bodies, institutions, and state regulation reveal how the external force of the social organisation of occupations can affect training and practice.

3.5 Concluding Discussion

This chapter has presented theoretical grounds for arguing that task-based qualifications and associated curricula cannot develop occupational capacity for practice. The previous chapter reviewed literature on competency-based training, a form of training focused on task performance, which has been heavily critiqued for its weakness with regard to knowledge within a curriculum. This chapter analysed the social organisation of occupations and the importance of specialised knowledge in shaping an occupation. The analysis shows that a task-based approach to training does not address contextual factors and thus will undermine learning programmes. In order to make an argument for the weakness of a task-based approach, the chapter used varied theoretical works to develop a conceptual web for occupational capacity (Abbott, 1988, 1989; Freidson, 1973, 2001; Standing, 2009; Winch, 2010, 2013, 2014, 2015). The conceptual web provides a lens to interpret the data on training for plumber and electrician occupations in later chapters. The conceptual web helps identify how different societal actors/organisations/forces and knowledge shape learning programmes within a vocational education system.

CHAPTER 4 METHODOLOGY

4.1 Overview

This chapter outlines how the case study design was used to analyse the kind of qualification and intended curriculum that emerges from occupational qualification reforms. case study methodology used in this research project. Section 4.2 discusses the process of case selection. Next, in Section 4.3, I discuss the data collection, where I outline the interviews, documents, and workshop observations that formed part of the fieldwork, as well as the different phases of the research and the ethical considerations. Additionally, I describe the data sampling. In Section 4.4, I discuss the data collection chronologically. Section 4.5 on Trustworthiness, Reliability and Validity describes analytical generalisation was built into the study where sequential analyses provided the means to triangulate the data, with Section 4.6 then noting the limitations of the research.

This doctoral research study explores occupational qualifications and their intended curricula using case study methods. The case studies support the analysis of qualifications and intended curriculum by adopting analytical generalisability, explained later in this chapter (Smith, 2018).The study is exploratory due to the relatively recent introduction of occupational qualifications in South Africa, in 2012, compared with the start of the research in 2016 (Creswell & Creswell, 2018). The empirical object—occupational qualifications—is framed as a phenomenon in the application of the case study approach (Creswell & Creswell, 2018). The data collection occurred from 2018 to 2020; however, it must be noted that changes to the electrician and plumber occupational qualifications, as well as to the policy on occupation qualifications, are ongoing. The implications for the research are difficult to quantify, for example in 2022 – the regulatory body (QCTO) has suspended the use of certain role players but there is little information on what how the suspension effects the broader processes of occupational qualifications development.

The hypothesis draws on the extensive critique of competency-based training in the literature (Chapter 2 Section 2.4 p. 31), which shows that a task-performance-based approach to learning programmes leads to the compromise of knowledge in curriculum content. My empirical object is occupational qualifications and their intended curricula, which were introduced in South Africa following the earlier adoption of the CBT-driven outcomes-based National Qualifications Framework. My preliminary fieldwork, which included informal conversations with policymakers and reviews of regulatory documents, indicated a focus on task performance in the occupational

qualifications. This was especially the case in regulatory documents describing occupational standards/tasks. Altogether, this led me to my hypothesis:

> The standardised design of occupational qualifications does not lead to a well-designed curriculum to prepare for occupational practice.

In retrospect, my initial theoretical work, which distilled the concepts of learning outcomes and design down in CBT approaches, was not sufficient to explore 'occupational practice' in my hypothesis; or more specifically, training that enables occupational practice. This led me to look at other literature on occupations to explore the different dimensions of occupational practice. I concluded I needed a theoretical object that supported the identification, interpretation, and analysis of data that addressed both the knowledge and specific societal concerns that influence the training for, and practice of, trades. My response was the conceptual development of specialised knowledge and social organisation of occupations as the basis for occupational capacity, which supported an analysis of training for occupational practice.

Below is the revised theoretical framing to explicate my hypothesis (Chapter 1), which seeks to capture occupational practice in the 'occupations conceptual web' that focuses on specialised knowledge and social organisation of occupations under the notion of occupational capacity (Chapter 3):

> A strong theme running through the existing literature is that the relationship between training and practice in occupations is subject to two forces: an internal force of specialised knowledge, which encapsulates systematically organised knowledge, occupational practice, skill, and autonomy; and an external force in the form of the social organisation of occupations by professional bodies, institutions, and the state. Both specialised knowledge and the social organisation of occupations and specialised knowledge underpin occupational capacity, which is a requirement for expert practice.

The development of the occupations conceptual web, in Chapter 3, occurred during fieldwork, which provided 'hooks' for the data identification and analysis that supported exploring the hypothesis. In this introductory section, I have broadly explained how the concepts discussed in the previous two chapters are used to identify and analyse the gathered data. In the next section, I outline the data that was collected.

4.2 Case Selection

Occupational qualifications in South Africa can be in fields as varied as the financial, agricultural, and retail fields. My initial case selection comprised trade-based qualifications and included the bricklayer, welder, electrician, and plumbing occupations. This case selection was based on two reasons. First, the four selected trades had been prioritised for occupational qualification development in national skills development planning. It was thus likely that the related learning programmes would be implemented in colleges and allow for an analysis of how guidance from intended curricula was developed into curriculum contents. Second, the intended curricula of all four selected occupations included aspects of physics, electronics, and mathematics, of which I had some knowledge through my bachelor's degree in computer science and information systems. As I initially intended to perform a curriculum contents analysis, it seemed logical to have some subject-matter knowledge for such an analysis.

Further, my expectation at the start of this research project, in 2016, was that I would be able to observe the implementation of the occupational qualifications in colleges. In 2016 and 2017, the second intended curriculum (national occupational curriculum content) was developed for both the plumber and electrician occupational qualifications. Its development seemed to solve the issues experienced in colleges, with trainers not being able to implement the accredited occupational qualification and first intended curriculum (curriculum framework). In 2018, it was availability of the intended curricula for the plumber and electrician occupational qualifications and the contact details of expert practitioners that participated in the development thereof that led to the exclusion of welder and bricklayer occupations from this research study. Additionally, the availability of interviewees was partly the reason for the reduction in the number of case studies to two occupations. However, at the time that I conducted my interviews with the plumber and electrician experts, in 2020, neither the electrician nor the plumber occupational qualification had been implemented in colleges. Both electrician and plumber experts interviewed cited issues with a national trade test as part of the delayed implementation of the occupational qualifications.

While a pilot of the second intended curriculum and learning contents of the electrician occupational qualification was conducted, I was unable to gain access to this pilot programme as it was implemented by the NPO and thus not in the public domain. Further, none of the electrician experts that I interviewed was heavily involved in the pilot. One of the electrician experts was involved in aspects of preparation for the trade test and also commented on aspects of the pilot

programme, but I was not able to verify the information received from them. I have thus not discussed the implementation of the occupational qualifications and curriculum contents. Yet the decision to focus on the plumber and electrician occupational qualifications was made due to the implementation timeline of both falling within my planned fieldwork period. However, the thesis does analyse the more explicit second intended curriculum which provides further details of the organisation of curriculum contents and prescribed lessons plans.

4.3 Data Collection and Data Sampling

The research explored the goals and outcomes of the processes to develop occupational qualifications and their two associated intended curricula (i.e. curriculum framework and national occupational curriculum content). The primary data set of legislative and regulatory documents framed how policy advice translated into the standardised guidance found in the templates used in the development processes for occupational qualifications and their two intended curricula. Additionally, the document analysis was supplemented with interviews with policymakers and facilitators, and observations from the three workshops that I attended. The data was thus collected from documents, interviews, and observation of intended curricula workshops.

This thesis thus explores the electrician and plumber occupational qualifications and their intended curricula to analyse their interpretation of training for occupational practice. In data collection, I used selective convenience sampling due to the availability of interviewees. The sampling is framed as selective, as my goal was to interview a cross section of actors. One drawback of convenience sampling was that I was unable to interview current vocational education trainers in the public sector. The three electricians and two plumber experts, whom I interviewed, were current private providers but had previous experience in public colleges.

I conducted 10 semi-structured interviews and also used fieldnotes from two informal conversations at the observed workshops. Three of the interviews were with policymakers; two were with facilitators, who were consultants instrumental in setting up the second intended curriculum (national occupational content curriculum) structure; five were with expert practitioners (two plumbers and three electricians), who had attended workshops for the development of the plumber and electrician occupational qualifications and their intended curricula. I interviewed two of the eight invited plumber expert practitioners and three out of the 11 invited electrician expert practitioners who participated in the respective workshops to develop

the two occupational qualifications (plumber and electrician) and their intended curricula. I have specified the number of invited expert practitioners because I was unable to access the attendance records for the workshops—this is an important detail considering my workshops observation that the number of participants fell by more than half on the second day of the workshops. The five expert practitioners confirmed their attendance at all the workshops for the relevant occupational qualification and its intended curricula. The interview questions for policymakers, facilitators and expert practitioners is in Appendix 2 (P. 182). As mentioned in the previous section, I had informal conversations with two more facilitators when I observed workshops.

The interview data was gathered in two phases. The first phase focused on roles and responsibilities in the occupational qualification and curriculum development processes. Below is the list of interviews that I conducted, with each individual interviewee identified by a generic name here—and throughout the thesis—based on their role:

- Policymaker 1 is a senior executive who develops policy and oversees the work of the QCTO and was previously involved with colleges in the technical and vocational education system.
- Policymaker 2 was instrumental in developing the second intended curriculum (national occupational content) for occupational qualifications and was previously a senior official at the Department of Labour.
- Policymaker 3 is a senior executive who oversees and manages Sectoral Education and Training Authorities, and works at the Department of Higher Education and Training.
- Facilitator 1 is a consultant, who works with an NPO and was instrumental in developing the second intended curriculum template and serves as a facilitator in the second intended curriculum development process.
- Facilitator 2 is a senior manager at the same NPO, tasked with developing the second intended curriculum in workshops, and oversees other related development processes.
- Facilitator 3 is a senior official at the QCTO and has served as a facilitator at development workshops for several occupational qualifications and their associated first intended curriculum (curriculum framework).
- Facilitator 4 is a consultant with several years of experience in developing short course programmes for education institutions.

The second phase of the research explored how the processes to develop occupational qualifications and their intended curricula were interpreted in training for two trades: electrician

and plumber. The case study approach provided more depth in exploring the intended curricula documents and workshop participants' experiences of developing the intended curricula through standardised processes defined by the regulatory body (QCTO). The interview data was primarily drawn from five experts who participated in the development of the occupational qualification ad intended curricula. The interview questions (Appendix 2: P. 187) were in two parts. The first part focused on the interviewees' training, industry, professional body, and trainer roles. The second part was related to their experiences as participants in the various development processes related to the occupational qualifications and their two intended curricula. A brief profile of the interviewees is as follows.

- Plumber Expert 1 is a member of a professional body in the plumbing industry and has several decades of experience working in the plumbing industry in various capacities including training and supplying plumbing equipment.
- Plumber Expert 2 is a third-generation plumber with experience in construction and plumbing, as well as plumbing maintenance gained until the early 1990s, before they moved over to training.
- Electrician 1 has several decades of experience in the construction industry, both as an employer and as a trainer. Their initial training occurred in the early 1990s.
- Electrician 2 has been training electricians for over 30 years.
  Electrician 3 gained extensive experience in railways and breweries, before they moved over to the field of training; and is an assessor for the trade test.

Altogether, the data for the study was gathered from 11 documents (detailed in Appendix 3 p. 190), 10 semi-structured interviews, two informal conversations, and numerous observations at two workshops for intended occupational qualification curricula.

4.3.1.Ethical considerations

The ethics approval for this research was approved and the letter is in Appendix 1. The approval was based on the risk to participants as low because they are not part of a vulnerable group. Participants prior to the interviews signed consent forms found in Appendix 4. My consent forms specified that I will not use individuals' names in my research, or in any publications that stem from this research. However, I will need to refer broadly to their position and type of organisation in my research. I refer to participants through pseudonyms in order to avoid any specific references that would reveal their identity.

4.4 Chronological Order of the Fieldwork

My initial fieldwork, in 2018–2019, started with interviews with officials at the QCTO and the Departments of Higher Education and Training, and Labour. My goal was to understand how the process for developing an occupational qualification and its associated curriculum worked. These interviewees suggested the documents, detailed earlier in Section 4.3, which would assist in understanding the processes and actors involved. Analysis of these interviews and documents led to the evidence that I present on the occupational qualification and curriculum development processes in Chapter 6 and on the general understanding of what drives the regulatory guidance for the development workshops and associated effects in Chapter 7.

During this period of initial fieldwork, I was also able to observe workshops at different stages of the intended curricula development. Each workshop that I attended had government officials—from the QCTO, SETAs, and the Departments of Trade and Industry, and Tourism—and individuals, who included trainers/lecturers (some who were also business owners) related to the occupational qualification. My workshop observations and informal conversations at the workshops were essential to my understanding of the development processes. I was able not only to observe participants but also to ask them questions regarding how the development processes and outputs occurred for the both intended curricula of an occupational qualification. The workshops had an average of 5–10 people where the number of people did reduce from the first day to the second day of the workshop. In the workshops, I refer to IT Participant 1 and IT Participant 2 who were experts in the field of training and practicing as IT technicians. It was during these workshops that I collected most of the data on facilitator roles and that I became aware of the facilitator's guide for the first intended curriculum development, which supplemented the facilitator interview data. I also became aware that this facilitator's guide was taught in the QCTO-led training for facilitators' of the occupational qualification and first intended curriculum development processes. Additionally, my understanding of the development processes presented in Chapter 5 draws on a flow chart I developed in conversations during these workshops, which supplemented the interview and document data later. It was also during this fieldwork phase that the facilitators' I interviewed provided the full list of names of expert practitioners and their contact details which I applied selective convenience sampling, and a draft overview of the second intended curriculum (national occupational content curriculum).

What followed the two sets of interviews, workshop observations, and document gathering was a period of data analysis. The data analysis consisted of identifying patterns across the documents, interviews, and workshop observations to determine whether the qualification and intended curricula documents were similar to outcomes-based qualifications and to identify patterns which indicated a holistic occupational approach. In looking to identify a CBT approach, I was looking for the same logic that underpins the development of learning outcomes and the use of design down in deriving curriculum. However, I struggled to clearly articulate what I was looking for in the data that reflected a contrast from a CBT approach that would point to holistic occupational training.

This struggle shaped the theoretical work presented in Chapter 3. It was clear during the conceptual development of occupational capacity that I required different data to discuss the societal conditions and knowledge factors that affect training and practice in occupations. The occupations conceptual web, which is presented in Chapter 3, went through several revisions during the fieldwork and the writing-up stages from 2018 to 2022. I started to gather and engage with theoretical work that explained an occupation as being based in knowledge, and social and economic processes. Most of my early work in this direction focused on categorisation, as I needed a better way of organising data and also more insight on what kind of data I was looking for. In 2018 and 2019, I set up the initial framework with categorisations, with the two main categories being 'professional curriculum' and 'society'. However, subsequent revisions were needed to address themes emerging through the data analysis in 2019 and 2020. The occupations conceptual web was finalised in 2022. This uses 'occupational capacity' as the requirement for practice and thus the goal of training. The development of Chapter 3 partly shaped my approach to the interviews with the occupational experts.

During mid- to late 2020, I interviewed two plumber and three electrician experts, who had participated in workshops for the development of the occupational qualifications and the two intended curricula. The occupational experts represented trainers and professional bodies and had decades of experience as practitioners and assessors. After this set of interviews, I attempted to broaden my interview data set in order to develop an occupational profile that chronologically captured changes in the occupations (plumber and electrician) affecting training and practice over time. At this time, I wanted to expand my data set to include observation of college classrooms and workplaces, with additional interviews with employers. My intention in expanding the data set was to compensate for the lack of curriculum content in colleges and to gain insights into

workplace training for electricians and plumbers. However, the intention to broaden the data set was hindered by the COVID 19 pandemic and my data collection phase was completed in 2020. To compensate for the lack of data from an employer perspective, the contents of Chapter 7 were reviewed by an HR manager. The HR manager had several decades of experience running apprenticeship programme in large food and manufacturing industry in South Africa and provided some employer perspectives.

4.5 Trustworthiness, validity and reliability

The section describes the process of data analysis to show how trustworthiness and reliability were addressed for the evidence presented in this thesis. The study's qualitative approach uses what Smith (2018, p. 137) explains as analytical generalisability. Analytical generalisability draws on concept generalisation and theoretical generalisation in two ways. Firstly, Smith (2018, p. 141) describes:

> analytical generalisation can happen when the researcher generalises a particular set of results to an established concept or theory, thereby displaying in their research concept generalizability or theoretical generalizability

In Chapter 2 on Competency-based training and Chapter 3 on the occupations conceptual web, I established from the literature that learning outcomes and design approaches are central to competency based training, and that specialised knowledge and the social organisation of occupations underpin occupational capacity – which is required for expert practice. In these two chapters, I have distilled concepts that were used to establish generalizability to a particular set of results.

Secondly, Smith (2018, p. 141) describes that "the researcher might re-examine established concepts and theories in a study through a different methodology and, in turn, produce new conceptual and theoretical understandings of a topic", where "qualitative data often drive conceptual construction and theorisation". As I described in the previous section, Chapter 3 on the occupations conceptual web was refined in relation to the data. Refining involved the explication and grouping of certain concepts was necessary to facilitate the data analysis. Thus, I combined the work of theorists of different disciplines to develop a new conceptual understanding of the topic – which I discuss in more detail in the contributions in the final chapter of the thesis.

Data analysis is based on four sequential analyses that built on each other that I will explain in this section. It was challenging to connect the intended objectives of development processes, and the actual development processes and resulting outputs of occupational qualifications and their associated intended curricula. The challenge was to explore how policy assumptions played out in the instructions, output documents, and intended curricula, alongside how participants experienced the process of developing the qualification and intended curricula. In this section, I explain how the thematic analysis was undertaken, using concepts from Chapters 2 and 3 to identify and organise the data for analysis, which provides the 'logic' of the two forms of intended curricula. The logic is found in the pattern of evidence that showed the connections between assumptions and implementation. There were three groups of data that informed the stages in which the analysis was carried out. The following paragraphs describe how the research built in validity and trustworthiness in gathering the data from different sources, and the efforts to triangulate findings.

First, I reviewed public documents explaining the processes to apply for new occupational qualifications and the regulator-provided facilitator guidance on templates to develop the curricula of occupational qualifications. In addition to reviewing the facilitator manual, I interviewed policymakers and facilitators, and observed workshops. Reviewing the documentary guidance helped me to gain a basic understanding of the processes. Then, I used this basic understanding as part of my interview questions and workshop observation. I sought to validate my understanding of the processes by having three sets of data points: documents, interviews, and observations. This first analysis is presented in Chapter 6 Section 6.2 (p. 91) on the first intended curriculum (curriculum framework). I used the concepts of learning outcomes, design down, and specialised knowledge in the analysis in this section.

Second, drawing on the first analysis, I examined the plumber occupational certificate curriculum documents. In this analysis, I was seeking to make connections between the facilitator guidance on the standardised templates and how that played out in the plumber first intended curriculum. My focus was on bringing the logic of the first intended curriculum to the surface, making explicit the organisation of the topics in the knowledge, practical skills, and work experience modules intended for curriculum content guidance. Additionally, I supplemented the example of the plumber first intended curriculum with interview data from plumber experts, to gain insight into the experience of working with the curriculum framework templates. This first intended

curriculum analysis is presented in Chapter 6 Section 6.3. (p. 94) I used the concepts of learning outcomes, design down, and specialised knowledge in the analysis in this section.

I also reviewed a more explicit, second intended curriculum, developed by the NPO, which draws on the curriculum document from the QCTO processes to develop the occupational qualification and first intended curriculum (in workshops with facilitators and a community of experts and practitioners). In the second intended curriculum analysis, presented in Chapter 6 Section 6.4 (p. 104) on the second intended curriculum, I used interview data to explain the intentions behind the structure with learning areas and projects in the template for the second intended curriculum. I provide an example from the draft second intended electrician curriculum. I supplemented the evidence with the experiences of both plumber and electrician experts to capture experiences in workshops developing intended curricula. It is important to note that the same experts participated in both the QCTO-led first intended curriculum, and the DHET and NPO-led second intended curriculum development processes. I used the concepts of learning outcomes, design down, specialised knowledge, and social organisation of occupations to analyse the role of actors and conditions that effect occupational training and practice.

I used the first analysis of the general guidance and first intended curriculum (curriculum framework) (Section 6.2 p. 91) for the second analysis of the interpretation of the plumber first intended curriculum (Section 6.3 p. 94) where I triangulate data to identify either a similar logic of task performance or (occupational capacity based) specialised knowledge in the documents and interview data on the second intended curriculum (Section 6.4 p. 104) for the electrician and plumber occupational qualifications. In the third analysis, I focused on how the draft templates for the second intended curriculum (national occupational curriculum content) sequenced topics from the first intended curriculum modules into prescribed classroom lesson guidance in the delivery of curriculum contents over the time allocation of the learning programme. As in the second analysis, I was triangulating data to identify either a similar logic of task performance or (occupational capacity based) specialised knowledge in the intended curricula content throughout—i.e. in the general guidance and the first intended curriculum (Section 6.2) in the interpretation of the first intended curriculum (Section 6.3), and in the second intended curriculum (Section 6.4). The first, second, and third analyses are presented in Chapter 6.

The fourth analysis engaged aspects of training that identified either task performance or (occupational capacity) specialised knowledge focus in occupational qualifications and their

intended curricula. I used concepts under the notion of occupational capacity developed in Chapter 3 to identify and analyse the aspects of training. I analysed the data from the plumber and electrician expert interviews, with reference to the facilitator and policymaker interviews, to identify how the processes to develop the plumber and electrician occupational qualifications and their intended curricula portrayed or ignored the development of occupational capacity. While the facilitator and policymaker interview questions sought to understand their views and inherent assumptions about training for trades, the questions in the occupational experts' interviews were structured to collect reflections on their experience of the intended curricula workshops in the context of their personal training journeys and current experiences of training plumbers and electricians. The occupational experts' reflections were sought to understand whether connections between the policy assumptions about and outputs of the processes of developing occupational qualifications and their intended curricula were similar or different. This fourth analysis is presented in Chapter 7, which shows how occupational qualifications and their intended curricula are different from training that develops occupational capacity.

4.5 Limitations of the research

As alluded to above, I was not able to analyse a full occupational qualification curriculum, interview employers or observe apprenticeship training in a workplace. These gaps limit the research in three ways. Firstly, the two versions of intended curriculum analysed provide general insight into a full curriculum but not into the details of scaffolding of knowledge in relation to practical skills development for student during college training. Where and when know-how, know-that, and inferential comprehension are taught was based on the view of experts in the field. Secondly, I have gaps on employer experiences with workplace training. While I have views from HR professional and the occupational experts interviewed have employer experience, I was not able to collect sufficient data to provide a holistic employer perspective with the social organisation of occupations analysis. Thirdly, observing how training to practice for apprentices occurs in the workplace would have been insightful for a discussion on the development of inferential comprehension abilities in connecting know-how and know-that, and more specifically provide insights into communities of practice. As I was not able to observe or interview apprentices and master craftsman, I am unable to substantively discuss how master craftsmen rely on curriculum at the college to support their training of apprentices which provides insight into connections between college curriculum and workplace training in their communities of practice.

4.6 Concluding Discussion

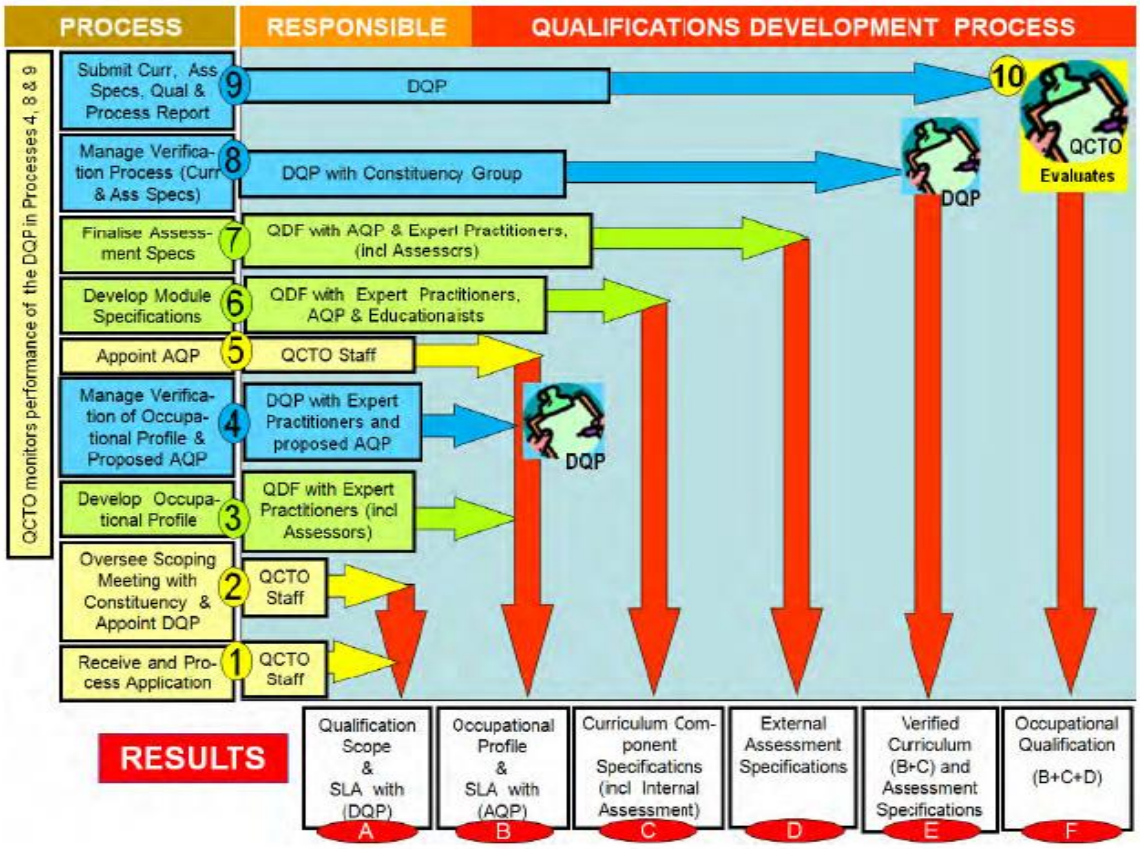
This chapter has covered the case study design of the thesis while explaining the data collection and analysis methods for the following three evidence chapters. The following chapter functions as both a methodology and an evidence chapter. In order to understand the logic of the intended curricula, it is necessary to have a basic understanding of the regulatory requirements for the development processes for the occupational qualifications and their intended curricula. The next chapter discusses the development processes and the role of different actors, the assumptions and requirements underpinning them, and how these actually played out in the development of the plumber and electrician occupational qualifications and their intended curricula.

CHAPTER 5 UNDERSTANDING THE PLAYERS AND PROCESSES

5.1 Overview

This chapter provides an overview of the processes of applying for, developing, and accrediting occupational qualifications and their intended curricula (i.e. curriculum framework and national occupational content curriculum). The processes are grouped into steps that highlight various actors' roles and responsibilities, and outputs, with a view towards assisting in understanding the evidence in the next two chapters. This chapter also introduces evidence on two aspects of these processes that emerged during fieldwork, which show the way in which the intended curricula can be further interpreted and the characteristics that shape the intended curricula in the processes. The first aspect relates to the optional development of a second intended curriculum (this process is described and analysed in the next chapter). The second relates to the regulatory body's use of a model of delegation, which I explain here in relation to the varied actors' responsibilities and their associated expertise. The third aspect is the lack of industry participation, and the chapter examines its potential implications.

The processes driving the development of occupational qualifications and their intended curricula are often described in procedural terms and can thus be confusing to navigate in terms of identifying what, or who, shapes the contents of the intended curricula. Hence, in describing the processes in this chapter, I follow the procedural steps laid out in the guidance documents, but supplement them with insights from policymakers and process participants to draw out the different actors' roles and responsibilities in producing the required output documents. Figure 5.1 is taken from the facilitator's manual produced by the Quality Council for Trades and Occupations (QCTO). The subsequent figures in the chapter draw on but also simplify this QCTO diagram and include additions and explanations to provide a clearer understanding of the different processes.



4 Figure 5.1 Graphic Representation of the Overall Occupational Qualification Development Process

Note: Reprinted from Quality Council for Trades and Occupations. (2014). *Occupational Qualifications Development Facilitator Manual*. Quality Council for Trades and Occupations. https://www.fpmseta.org.za/downloads/QDF_Manual.pdf

5.2 Overview of the Processes

There are three broad groups of steps in the occupational qualification development process from the point of application for an occupational qualification to the availability of the qualification, its intended curricula, and learning contents in colleges. The three broad groups of steps are as follows:

1. application for a new occupational qualification to the regulatory body;
2. development of the occupational qualification and first intended curriculum; and
3. optional development of the second intended curriculum and learning contents.

In total, there are eight mandatory steps under Groups 1 and 2, and four optional steps under Group 3. Each broad group of steps involves various actors who have responsibilities either to oversee or to develop an output, which are explained below. In this section, I use a flow chart-style diagram to explain the steps visually. I developed the flow chart during fieldwork, and it is

based on the regulatory body's facilitator manual, informal conversations workshop observations, and interviews with Policymakers 1–3 and Facilitators 1 and 2.

Group 1 (mandatory): Application for a new occupational qualification to the regulatory body

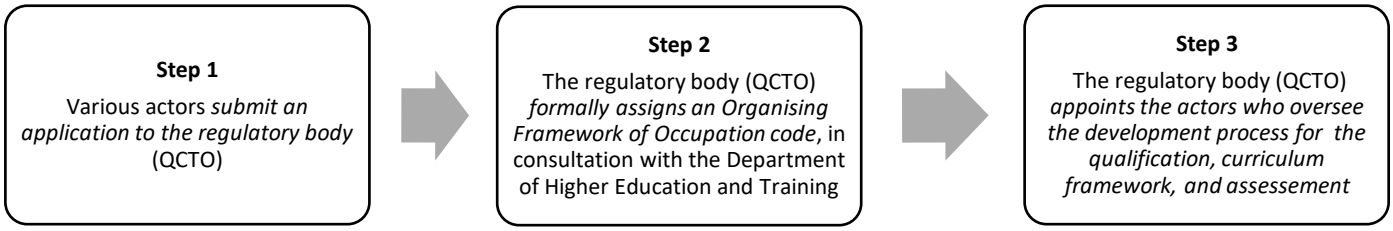


Figure 5.3 Responsible Actors and Functions (in italics) in the Process Initiating the Development of a New Occupational Qualification

Group 2 (mandatory): Development of the occupational qualification and first intended curriculum

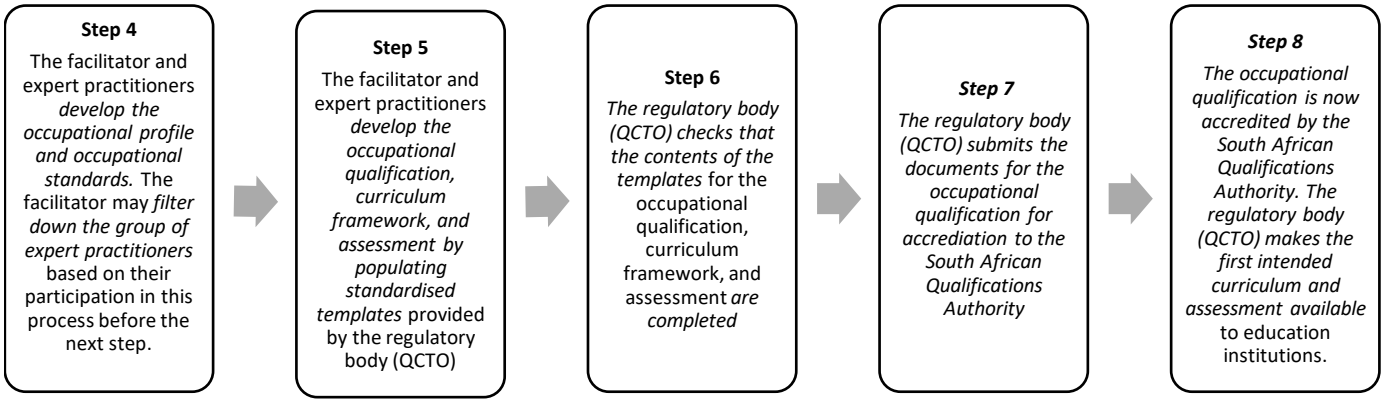


Figure 5.4 Development and Finalisation of the Occupational Qualification and the Curriculum Framework Documents Containing the Assessment Criteria for Accreditation

Group 3 (optional): Development of the second intended curriculum and learning contents

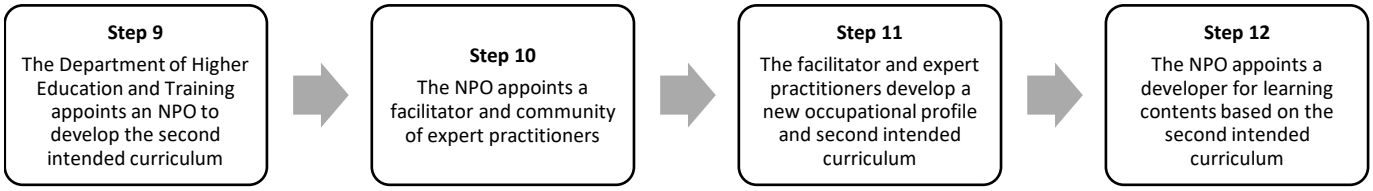


Figure 5.5 Example Development and Finalisation of the Second Intended Curricula and Learning Contents for an Accredited Occupational Qualification

5 Figure 5.2 Summary of Actors and Processes Described in This Chapter

5.2.1 Group 1 (Mandatory): Application for a New Occupational Qualification to the Regulatory Body

The first group of steps—Steps 1–3 below—is the application for the development of a new occupational qualification and the first intended curriculum (curriculum framework). From the expert practitioner interviews in the two case studies of the electrician and plumber occupations, I learned that the reason for a new occupational qualification application was a combination of the registered qualifications expiring and the regulatory requirements to move trade qualifications to the Occupational Qualification Sub-Framework. In the case of the two IT occupational qualifications, I learned in workshop observation that the applications were made due to the required updates for training.

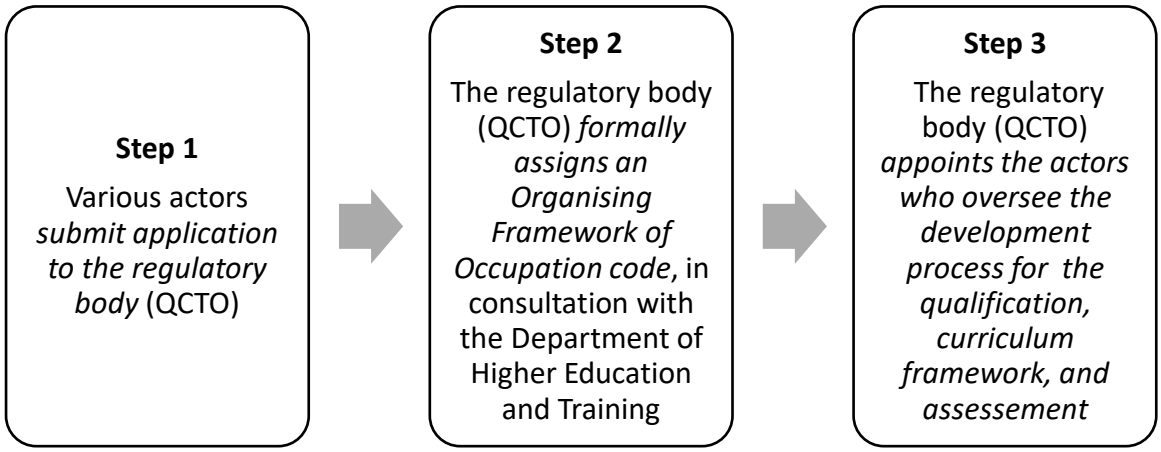


Figure 5.3 Responsible Actors and Functions (in italics) in the Process Initiating the Development of a New Occupational Qualification

Step 1 is the submission of an application for a new occupational qualification to the regulatory body, i.e. the QCTO. Various actors can submit applications—for example, Sectoral Education and Training Authorities,[4] which are similar to the sectoral training bodies in the UK; employers or employers' associations; professional bodies; education institutions; or social partner

[4] A Sectoral Education and Training Authority (SETA) is a body established in terms of the Skills Development Act to develop and implement sector skills plans and promote learning programmes, including workplace learning. The Quality Council for Trades and Occupations (QCTO) has delegated quality assurance powers to SETAs. (National Qualifications Act, 2008 (Act No. 67 of 2008): Occupational Qualifications Sub-Framework [OQSF] Policy, 2014, p. 6)

organisations. The actor submits the application to develop an occupational qualification to the QCTO.

Step 2 is the formal assignation of an Organising Framework of Occupations (OFO) code to the occupational qualification; the code is part of the application for a new occupational qualification. The OFO[5] is a hierarchically coded occupational classification system, overseen by the Department of Higher Education and Training. The code is drawn directly for the application for the occupational qualification. The QCTO consults with DHET to verify the code. The code is assigned to signify the existence of the occupation in the South African labour market, and the link to the occupational qualification is intended for national skills planning strategies (Policymakers 1, 2, and 3). The process of formally assigning the code to the occupational qualification is a function of the regulatory body.

Step 3 comprises the process whereby the QCTO appoints the actors to oversee the development process of the occupational qualification, the first intended curriculum and assessment, and the summative assessment (formally referred to as the Development Quality Partner and Assessment Quality Partner).[6]

The documentation indicates that the QCTO engages with the applicant for the new occupational qualification in Step 1 to select the actors who oversee the development and summative assessment processes (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2013). In the two case studies (electrician and plumber) and the observation of the two IT qualifications, the actor responsible for the development process was the applicant for the occupational qualification in Step 1. In the case studies, the actor responsible for the electrician occupational qualification was the sectoral training body while the professional body was the actor responsible for the plumber occupational qualification. However, as Policymaker 1 (a senior QCTO official) explained, the actor responsible for the summative assessment in the documentation was often the sectoral training body—i.e. the relevant SETA—falling under DHET. Policymaker 1 explained that the summative assessment was either an external integrated

[5] The Organising Framework of Occupations (OFO) is a coded classification system to encompass all occupations in South Africa and is used by the Department of Higher Education and Training (DHET) as an essential tool for identifying, reporting, and monitoring skills demand and supply in the South African labour market. (National Qualifications Act, 2008 (Act No. 67 of 2008): Occupational Qualifications Sub-Framework [OQSF] Policy, 2014, p. 5)

[6] These processes are currently under review.

summative assessment (EISA) for a non-trade occupational qualification or a trade test for a trade occupational qualification (Policymaker 1).[7]

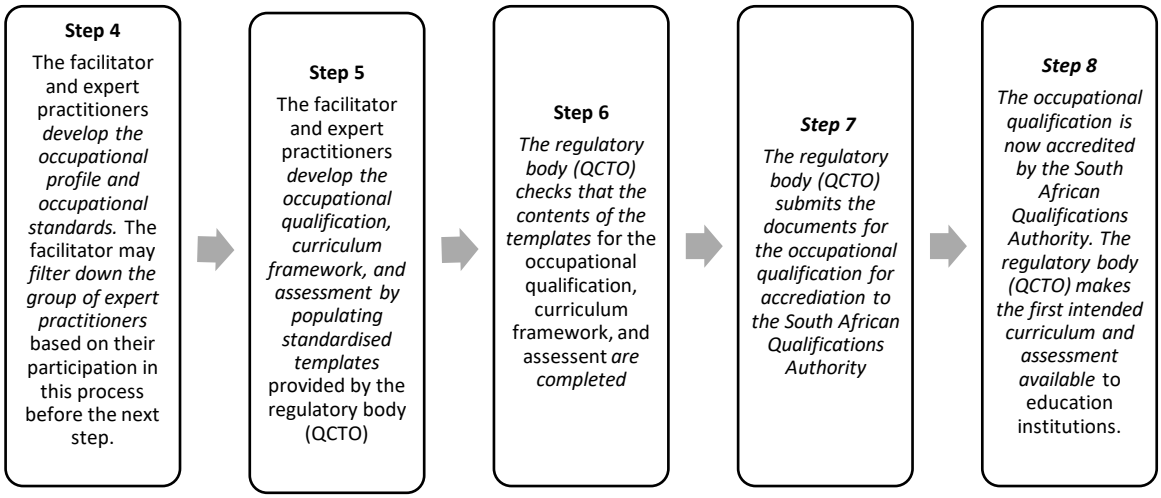
The actor that oversees the development process of the occupational qualification, first intended curriculum and assessments appoints the facilitator and community of expert practitioners (CEP). The facilitator is trained by the regulatory body—the QCTO—in the use of standardised templates for the occupational qualification[8] and first intended curriculum. The regulatory body training draws closely on the *Occupational Qualifications Development Facilitator Manual* (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014). The facilitator is trained to lead the workshops with the expert practitioners to populate the templates. The appointment of expert practitioners is intended to be a careful selection of a variety of actors based on their roles in the occupation's training and practice. I found through *Occupational Qualifications Development Facilitator Manual*, interviews and workshop observations that the expert practitioners are a representative combination of industry professionals, public and private college lecturers, trade test assessors, relevant SETA officials, and department officials.

5.2.2 Group 2 (Mandatory): Development of the Occupational Qualification and First Intended Curriculum

Group 2 consists of Steps 4–8, as captured in Figure 5.4. The steps are focused on populating and finalising the templates for the occupational qualification and first intended curriculum and on submitting the accreditation documents for the occupational qualification to the qualification accreditation body. Upon accreditation, the occupational qualification and first intended curriculum documents are available for use by public and private colleges.

[7] The five expert practitioners that I interviewed cited issues with the processes involved in the trade test assessment at the regulatory body that were partly responsible for the lack of implementation of occupational qualifications at colleges. During fieldwork, it was difficult to understand what the exact issues were with the trade test assessment.

[8] The occupational qualification template follows the accreditation requirements of the South African Qualifications Authority (SAQA)—the statutory authority established in terms of the National Qualifications Act of 2008 (which replaced the SAQA Act of 1995) to oversee the further development and implementation of the NQF, the achievement of the objectives of the NQF, and the coordination of the three sub- frameworks (National Qualifications Act, 2008 (Act No. 67 of 2008): Occupational Qualifications Sub-Framework [OQSF] Policy, 2014, p. 6).



6 Figure 5.4 Development and Finalisation of the Occupational Qualification and the Curriculum Framework Documents Containing the Assessment Criteria for Accreditation

Step 4 consists of the first part of the workshops for developing the occupational qualification and first intended curriculum. The first part focuses on generating the occupational profile containing the occupational standards, according to the instructions for the standardised templates in the QCTO facilitator's manual. The expert practitioners, guided by the facilitator, brainstorm the main tasks that make up practice in the specific occupation: the occupational standards (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2013). The occupational profile is finalised through consensus on the occupational standards. The evidence from this step is discussed in the next chapter (6), with the discussion there drawing on the general regulatory guidance and examples from the first intended curriculum, as well as the experiences of expert practitioners gleaned from interviews.

Step 5 represents the second part of the workshops to develop the occupational qualification, first intended curriculum, and assessment criteria—which are the output documents of this step—by the facilitator and expert practitioners. The occupational qualification is designed based on the templates for qualification accreditation under the National Qualifications Framework, according to the South African Qualifications Authority. The first intended curriculum follows the standardised QCTO template format of knowledge, practical skills, and work experience modules, with each module having its own assessment criteria (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014).

Step 6 consists of the performance of quality assurance on the output documents from the previous two steps (Steps 4 and 5). The documents for the occupational qualification, first intended curriculum, and assessment criteria are reviewed by the QCTO as the regulatory body.

Step 7 comprises the submission of the documents by the regulatory body to SAQA for accreditation of the qualification.

Step 8 represents the availability of the occupational qualification, first intended curriculum, and assessment criteria for use by education institutions. At this point, the actor responsible for the application and development of the new occupational qualification and first intended curriculum delegates to the various bodies or individuals responsible for the assessment of the occupational qualification.

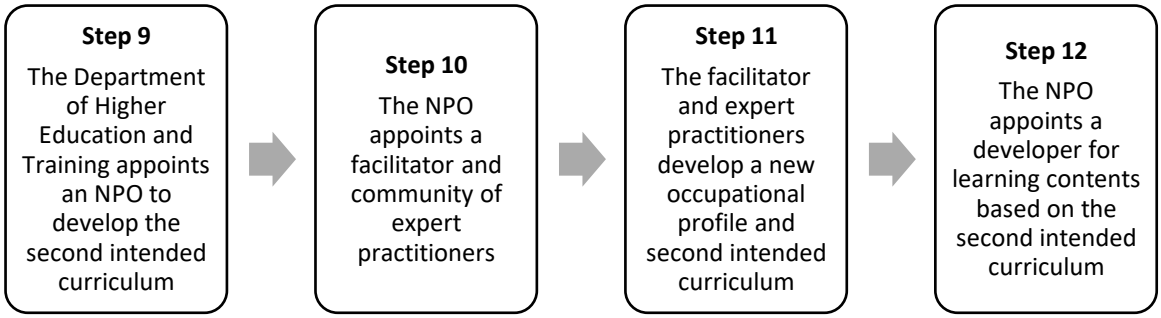
In Step 8, the occupational qualification and its first intended curriculum are now available for colleges, from the point of view of the QCTO. However, an unexpected problem arose at the point of delivery for some public education providers, with Policymakers 1 and 2 explaining that the lecturers at public colleges could not implement the curriculum. The plumber and electrician occupational qualifications investigated in this thesis indeed had problems with curriculum implementation at public colleges. Policymaker 2 explained that private education providers had "no problems" implementing the new qualifications and noted that a lack of capacity and funding at public colleges prevented the uptake of occupational qualifications. However, the plumber and electrician occupational qualifications had not been implemented in either public or private colleges by the end of 2020.

In the two occupational qualifications and one two-day workshop that I observed, the problems with the implementation of the first intended curriculum led DHET to contract a non-profit organisation to develop a second intended curriculum called the national occupational content curriculum or NOCC. In theory, DHET could have appointed another body to develop a second intended curriculum who could have used a different model or process from the one described in this thesis. During my fieldwork, it was difficult to verify the number of occupational qualifications for which a second intended curriculum had been developed due to the curriculum implementation problems at colleges. The decision about which occupational qualification requires a second intended curriculum is made by DHET.

While the two groups of eight steps outlined above are mandatory and form part of the national regulatory process, the next group of four steps—Group 3—on the second intended curriculum had not been formally integrated into the regulatory process by the end of the fieldwork for this thesis. I have chosen to include the optional processes comprising Group 3 here because part of the evidence presented in the next chapter is an analysis of this second intended curriculum. These optional processes provide additional insights into how the standardised template for the first intended curriculum of an occupational qualification can be interpreted into more explicit guidance for curriculum content for learning programmes. These insights add to the understanding of occupational practice and training underlying the intended curricula of occupational qualifications.

5.2.3 Group 3 (Optional): Development of the Second Intended Curriculum and Learning Contents

Group 3 contains four steps for the development of the second intended curriculum and learning contents for an occupational qualification. The second intended curriculum is a more explicit version that sequences the content of the first intended curriculum (curriculum framework), with additional content where necessary. It is important to note that the NPO uses the occupational qualification and first intended curriculum from the QCTO process, with oversight from DHET, to develop the second intended curriculum. In this research, I investigated an NPO's development of the second intended curriculum.



7 Figure 5.5 Example Development and Finalisation of the Second Intended Curricula and Learning Contents for an Accredited Occupational Qualification

Step 9 is the appointment of the NPO to develop the second intended curriculum by DHET.

In the plumber and electrician occupational qualifications, the template for the second intended curriculum was developed by consultants and government officials (Facilitator 1 and Policymaker 2). The second intended curriculum specifies learning areas and project-based guidance that uses the occupational qualification's first intended curriculum's knowledge, practical, and work experience modules and assessments (Facilitator 1 and 2). The creators of the NPO's second intended curriculum process state that the process and templates are industry-led, based on which the focus is on tasks in the workplace (Facilitator 1 and Policymaker 2). The second intended curriculum process is explained with the help of interviews with the creators of the template and examples, which form part of the evidence presented in Chapter 6.

In Step 10, the NPO appoints the facilitator and community of expert practitioners for the development of the second intended curriculum. In the plumber and electrician occupational qualifications, the community of expert practitioners was the same group in both intended curricula development processes; however, the facilitator was not the same person.

In Step 11, the facilitator leads the workshop to develop the occupational profile, where the main tasks of the occupation are identified through consensus among the participants. The second intended curriculum templates used by the facilitator provide guidance for the participants in sequencing the main tasks of the occupation, to organise a curriculum overview. The curriculum overview is then used to populate the learning areas and projects using contents from the first intended curriculum's knowledge, practical skills, and work experience modules, with additions from the expert practitioners (workshop observation, Facilitator 1 and 2). The evidence presented in Chapter 6 draws on examples from the second intended curriculum and the experiences of expert practitioners.

Steps 12 represents the development of learning contents, which function as a textbook for the lecturer and students. I have drawn the details of the learning contents development process from Facilitators 1 and 2. The NPO responsible for the second intended curriculum appoints a subject-matter expert as the developer of the learning contents. The learning contents use the second intended curriculum as a guide for content. The learning contents follow a workbook, style with the learning areas and its associated learning project, based on the second intended curriculum, broken into detailed steps and questions with tasks. Each lecture contains prescribed learning materials. Additionally, as Facilitators 1 and 2 explained, the facilitator for the second intended

curriculum development process works closely with the learning contents developer during the learning contents development period.

5.3 Characteristics of the Process in the Data

In the previous section, I outlined the regulatory and optional steps in the processes of applying for, developing, and accrediting a new occupational qualification and its intended curricula. In this section, I highlight those characteristics of the process that were described in interviews and were gleaned from workshop observation but which are not immediately evident from the formal descriptions of processes. This section covers two characteristics: the use of a delegation model and the lack of industry participation.

5.3.1 Delegation Model

The development of an occupational qualification and its first intended curriculum occurs under the aegis of the regulatory body, i.e. the QCTO. Early in my fieldwork, Policymaker 1, a senior regulatory body official, briefly described how the regulatory body uses a "model of delegation", in which appointed actors with the necessary expertise perform specific functions, such as the development of the occupational qualification and first intended curriculum. The delegation model means that the regulatory body relies on external experts to develop the contents of the occupational qualification and first intended curriculum. Policymakers 1 and 2 explained that an essential part of the delegation function is to ensure that the occupational qualification, curriculum framework, and assessment criteria development processes focus on workplace practices as expressed by industry. The processes in the second intended curriculum use the delegation model in an almost identical manner, with appropriate actors delegated responsibilities in a similar way as by the regulatory body.

In theory, the model of delegation identifies and prioritises expertise in areas, such as when occupational expert practitioners are sought to advise on the intended curriculum contents. During fieldwork, it was unclear how types of expertise were related to the selection of, and delegation to, particular actors. There are two examples from the data.

The first example is the expertise of facilitators. The facilitators in the occupational and intended curricula development processes were not subject-matter experts in the plumber, electrician, and

two IT occupational qualifications. The facilitators were often individuals who had completed training provided by the regulatory body or NPO in populating the templates. The QCTO facilitator's manual, which underpins the training, has detailed instructions on how to populate the first intended curriculum template. The general understanding is that facilitators will source the content from the community of expert practitioners for the intended curriculum template. The three electrician experts highlighted conflicts in the choices of subject matter in the construction of the intended curricula. In the workshops that I attended, I also observed conflicts in the choices of subject matter among the different expert practitioners. The three electrician experts expressed that the conflicts were due to their own specialisation requirements, and the workshop expert practitioners cited their requirements in relation to the training available. While conflicts in curriculum construction are typical, the resolution often occurs among subject matter experts who understand the construction of systematically organised knowledge that underpins practice. Drawing on the discussion of specialised knowledge in Chapter 3 Section 3.3. (p. 41), it is difficult to argue that facilitators who are not required to have subject-matter expertise and are trained to populate templates, can mediate conflicts over curriculum content choices in the intended curricula.

Second, current occupational practitioners are included in the development of intended curricula. In the second intended curriculum workshop for an IT occupational qualification that I observed, some of the participants were current practitioners in the IT occupation. Facilitators 1 and 2 explained that workers' feedback was sought for identifying the main tasks for the occupational profile in the second intended curriculum. Documentation for the first intended curriculum, under the aegis of the regulatory body, also identifies 'workers' as participants in the development of intended curricula (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014). My observation was that current occupational practitioners could describe current work tasks and scenarios, but they struggled to articulate how 'they knew what to do'. The rationale underlying the questions posed to occupational practitioners in the workshop was to clarify what tasks were performed in the workplace. However, as occupational practitioners were further questioned on knowledge, practical skills, and work experience for the curriculum content, I observed that these questions were difficult. While occupational practitioners can provide insights into current requirements, they may have insufficient expertise in constructing the subject matter for the intended curriculum.

In this section, I have highlighted two examples from the processes of developing occupational qualifications and their intended curricula that raise questions about how the delegation model is used. The problem is not with the notion of delegating to other experts for certain functions, but with how expertise in constructing the intended curricula based on specialised knowledge is linked to the requirements for the delegated individuals in the processes.

5.3.2 Problems with Industry Participation in the Community of Expert Practitioners

As discussed in this chapter, the selection and appointment of expert practitioners to develop intended curricula is driven by the body appointed to oversee the development process. What is not immediately apparent from the documentation is that participation in the development processes for occupational qualifications and their intended curricula is voluntary. Voluntary participation means that while the intention is to have an inclusive stakeholder process, the reality is that participation is driven by the availability and willingness of individuals to participate. This section discusses the data that emerged in the interviews with policymakers and facilitators, and in workshop observation, where concerns were raised about the lack of industry participation. Additionally, the Human Resources (HR) Manager provided insights from the employer's perspective.

Voluntary participation was concerning for Policymakers 1 and 2 and Facilitators 1, 2, and 3, who noted the lack of industry participation or participation by the "right" industry representatives in the communities of expert practitioners (CEPs). The industry representatives who were committed to the CEPs could be unreliable due to their availability (Policymaker 1). Therefore, the CEPs ultimately represent the people available at a particular time to develop the occupational qualification and associated intended curricula containing the assessment criteria, rather than the best combination of expert practitioners for developing occupational training (Policymaker 1).

Facilitators 1, 2, and 3 cited problems with industry participation as being due to scheduling conflicts or lack of interest. Policymakers 1 and 2 and Facilitators 1 and 2 believed that the right industry representatives were the master craftsmen and artisans who could discuss their work, rather than human resources staff or senior managers. The problem expressed with HR staff or senior managers was that they did 'not do the work' that required specification in the intended curricula. The problems with employer participation expressed by policymakers and facilitators could be interpreted differently from the employer's point of view.

The HR Manager highlighted that the problem of lack of industry participation is more likely to be associated with clarity on the type of expertise required for a specific meeting. Whereas HR professionals understand the NQF and its associated structure of qualifications, an artisan or engineer understands the occupational practice. Thus, it is unlikely that either the artisan or the HR professional will have a complete understanding of what is required for the workshops to develop qualifications and their intended curricula. The HR Manager used the difference between a scaffolding and a building as an example. While an HR professional understands what the building is for and how the rooms are to be used, they will not understand what happens under the scaffolding. What lies under the scaffolding is how the building was constructed—which only the engineer and artisans will understand. The HR Manager suggested that the lack of "right" industry participation could be due to a lack of clarity on who is the appropriate attendee for the qualification and intended curricula development meetings. The points the HR Manager raised, in comparison to the prioritisation of employer participation by Policymakers 1 and 2, suggest that there may be parts of the qualification and intended curricula development that are difficult for industry to participate in. The difficulty lies in processes that are bound up with either regulatory qualification requirements or curriculum construction expertise, which could be difficult to navigate for an industry participant.

The key point in this section is that an intended curricula development process that is intended to prioritise employer requirements may lack industry participation. This lack of industry participation is problematic because the occupational qualification and intended curricula development processes are designed to determine what the intended employers of occupational practitioners want (whether within an organisation or from independent contractors) and for this to be addressed in training. There are attempts to authenticate what is occurring within the development processes against what a potential employer would look for in a graduate. The facilitators indeed reach out to employers to validate the intended curricula (Facilitators 1, 2, and 3). Additionally, what was considered valuable in place of employer participation was the experience of the community of expert practitioners who were instructors and often worked closely with the industry to provide qualified graduates in the two occupational qualifications investigated in this thesis. For example, in the workshops that I observed for the two IT qualifications, some of the expert practitioners were both trainers and owners of businesses that provided IT services. Despite the attempts to include the employer's viewpoint, the general lack of employer participation seems to undermine the intended curricula development processes that

are ultimately geared towards providing employers with what they want in occupational practitioners.

5.4 Concluding Discussion

This chapter has explained various actors' roles and responsibilities, and steps in the processes of applying for, developing, and accrediting a new occupational qualification and its intended curricula. This broad understanding of the processes serves to provide background for the content in the two evidence chapters (6-7) and the discussion chapter that follow in this thesis. There are two characteristics of the processes that I have highlighted. First, the regulatory body—the QCTO—uses a model of delegation. It delegates the development of the occupational qualification and its first intended curriculum to an external partner, who manages and oversees the process of developing the first intended curriculum. Second, there is a lack of industry participation in the processes that claim to prioritise employer requirements as a driver of guidance on curriculum contents. The next chapter presents evidence on the processes to develop the intended curricula.

CHAPTER 6 THE LEARNING OUTCOMES APPROACH OF OCCUPATIONAL QUALIFICATIONS AND THEIR INTENDED CURRICULA

6.1 Overview

This chapter presents three sets of evidence from the guidance and instructions for templates for occupational qualifications and their intended curricula (curriculum framework and national occupational content curriculum), alongside examples from the intended curricula for plumber and electrician. Altogether the data from the documents, interviews, and workshop observations show the use of competency-based training approaches. The first set of evidence shows that the underpinning logic of the general guidance and instructions for templates for occupational qualifications and the first intended curriculum (curriculum framework) is a task-focused design. The second set of evidence dissects an example from the first intended curriculum for plumber, which reveals that occupational standards/tasks are a type of learning outcome. Additionally, the use of 'design down' from occupational standards/tasks as the primary method of deriving contents for the first intended curriculum shows how systematically organised knowledge is reduced. The third and final set of evidence explains the general structure of the second intended curriculum (national occupational content curriculum or NOCC) and dissects two examples from the second intended curriculum for electrician. This set of evidence reveals how the guidance for sequencing curriculum content according to tasks breaks down the structure of systematically organised knowledge by prioritising certain types of knowledge related to task performance.

Before substantial analysis of occupational qualification and their intended curriculum, I give a brief overview of the credits and time allocations for occupational qualifications to provide basic information. One credit is equal to ten notional hours, which include formal classes, self–study, writing assignments or developing practical skills ills in the workshop. The hours represented in Figure 6.1. for the classroom, workshop and work experience are notional hours and represent how long a student is allocated to mastering knowledge areas, practical skills and apprenticeship training at a workplace.

Qualification Information	Electrician Occupational Certificate	Plumber Occupational Certificate
Qualification Credits	360	360
Knowledge Module Credits	91	100
Practical Skills Module Credits	113	130
Work Experience Credits	156	130
College Classroom Hours	910	1000
College Workshop Hours	1130	1300
Work/Apprenticeship Hours	1560	1300

8 Figure 6.1 Overview of the credits and time allocations for occupational qualifications

Additionally, Figure 6.2 provides an overview of the competencies and credits for the first intended curriculum to provide some basic information. As is noted in the analysis, the second intended curriculum draws on the competencies and credits of the first intended curriculum.

First Intended Curriculum Structure	**Electrician Occupational Certificate**	**Plumber Occupational Certificate**
Number of occupational standards	5	4
Number of Exit Level Outcomes	5	4
Number of Competences	54	40
Number of First Intended Curriculum document pages	130	96

9 Figure 6.2 Overview of the competencies and credits for the first intended curriculum.

As discussed in Chapter 5, the goal of the occupational qualification was to consolidate several qualifications under one qualification, as explained by Policymaker 1. This means that the Plumber

and Electrician occupational qualifications combined content from previous NQF 2,3 and 4 required to qualify to practice. Combining three qualifications into one qualification can cause some confusion with entry requirements and recognized prior learning. The previous qualification for Electricians was an NQF 4 in Electrical Engineering but there were several pathways into such a qualification. du Plessis (2015) outlined three pathways for entry into the NQF 4 in Electrical Engineering which highlights several lower qualifications.

Pathway	Pathway one - Minimum Integrated Practical and Theoretical Qualification	Pathway two – Practical Qualification	Pathway three- Theoretical Qualification
Requirements to register as a installation electrician	• Achieved a National Certificate in Electrical Engineering: NQF level 4 issued by the EWSETA • Submit documentary proof of successful completed unit standards on inspection, testing and certification of three phase industrial/commercial installations as prescribed by the EWSETA.	• Submit proof of having passed: The prescribed trade test in terms of the Manpower Training Act of 1981 or Skills Development Act of 1998 in one of the following trade disciplines: Electrician, Electrician (Engineering) , Electrician (Construction) , Millwright (Electro-mechanical), Lift Mechanic OR • The Electric: Chemical Electrical NQF level 4 qualification issued by the Chemical Industries Education and Training Authority (CHIETA). • Submit documentary proof of successful completed unit standards on inspection, testing and certification of three phase industrial/commercial installations as prescribed by the EWSETA	• Submit a Diploma or Degree in Electrical Engineering: T3 Diploma (Heavy Current) S4 Diploma (Power Engineering) B-Tech Degree BSc or B Degree Government Certificate of Competency (Factories or Mines) • Submit documentary proof of successful completed unit standards on inspection, testing and certification of three phase industrial/commercial installations as prescribed by the EWSETA.
Minimum theoretical qualification :		• National N3 Certificate with the following compulsory subjects: Mathematics Engineering Science or Industrial Electronics Electrical Trade Theory or Electro technology OR Grade 12 (Standard 10) Certificate with Mathematics, Science and Technical l– electrical or an equivalent subject that may include N3 subject Note 1: The candidate must pass each subject with a minimum of 40%. Note 2: These minimum theoretical subjects could be a combination of Grade 12 and N3 subjects.	
Knowledge for Statuary Requirements	Submit proof of knowledge on the legislation and relevant health and safety standards applicable to the electrical installations by having passed the subject Installation Rules as administered by the Department of Higher Education and Training.	Same as Pathway 1	Same as Pathway 1

10 Figure 6.3. Pathways to become a qualified electrician

In the previous NQF 4 qualifications, the requirement to enter the electrician qualification is an NQF 3 certification in a related trade, such as an NQF 3 in Electrical Engineering where certain theoretical and practice requirements are outlined in Figure 6.3. The occupational qualification is requires Grade 9 or NQF level 1 qualification with Maths and Science, which is far lower than the

requirement for the previous NQF 4 Electrical Engineering qualification. The lower requirement for entry is because the occupational qualification the curriculum covers theoretical and practical modules in previous NQF 2 and 3 qualifications, in addition to the NQF 4 content. The same logic applies to the Plumber occupational qualifications.

This chapter identifies the presence of CBT approaches in the occupational qualification development process in the repetitive aligning of intended curricula to the occupational standards/tasks found in the occupational profile, in three sections. First, beginning with the policy intention, I describe the centrality of occupational standards/tasks in developing the intended curricula in the regulatory guidance and instructions that frame the development processes, by analysing policymakers' views and regulatory documents. Second, I show how the CBT approaches of learning outcomes and design down are to be found in the first intended curriculum, using an example from the first intended curriculum for plumber, with insights from an interview with a plumbing expert. Third, I look at the emergence of the second intended curriculum and two examples from the intended curricula for electrician, drawing on documents and interviews with plumbing and electrician experts. The examples reveal how the CBT-inspired first intended curriculum is interpreted in the second intended curriculum, where systematically organised knowledge is broken down in the sequencing of curriculum content according to work tasks. Altogether, the three sets of evidence show that CBT methods drive the process of developing occupational qualifications and their intended curricula. Additionally, and similar to the literature on CBT approaches, the evidence shows that the focus on training to perform tasks restricts the types of knowledge in the curriculum contents and breaks down systematically organised knowledge. Thus, at the end each section, I discuss how the evidence on CBT approaches in occupational qualifications and their intended curricula contrasts with the concept of specialised knowledge as part of the notion of occupational capacity developed in Chapter 3 Section 3.3. (p. 41).

6.2 Occupational Standards as a Form of Competence Statements/Standards

The section presents evidence on the general guidance for occupational qualifications and their first intended curricula from legislative documents, the Quality Council for Trades and Occupations facilitator's manual, and an interview with Policymaker 1, a senior QCTO official. The policymaker's views and instructions for the first intended curriculum templates reveal assumptions about how further prescribing the definition of a work task leads to the required

occupational training. The general guidance is the starting point for understanding how the intended curriculum content examples in the next two sections have been derived from occupational standards that narrowly foreground task performance.

A common theme emerged in the interview with Policymaker 1 and official documentation: occupational standards are broad competencies articulated as an occupation's main tasks. The set of occupational standards/tasks found in the occupational profile expressed a holistic view of the occupation's work. Policymaker 1 simultaneously described occupational standards as a broad competence and referenced a specific work environment. They explained that occupational standards, generally speaking, are not discrete, as standards are blended in developing the qualification and are not job specific. The difference between occupational standards and learning outcomes, Policymaker 1 argued, is that the latter are based on discrete work tasks. Policymaker 1 described the qualities of an ideal occupational standard as industry-defined, leading to several jobs (e.g. "set up a computer"), and related to a skill. Additionally, Policymaker 1 defined an ideal occupational standard thus: "A standard would specify what is the exact competence of the learner that would be in that particular occupation".

This description seems to draw on both a specific and a broad notion of competence in occupational standards. The use of "exact" implies specific, while the use of "competence" can be interpreted as being broader. However, when the explanation of occupational standards provided by Policymaker 1 is compared to the QCTO facilitator's manual, the difference between the breadth of competence as a concept and the rigid reality has similarities to Wolf's (2001) account of the rigidity of CBT learning outcomes (discussed in Chapter 2 Section 2.4 p. 32). The facilitator's guide uses the terms "occupational standards" and "occupational tasks" interchangeably, which hints at the centrality of task performance (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014, p. 22). When defining an occupational task, the facilitator's guide states, "Each task also incorporates a related product or service, occupational responsibilities and one or more occupational contexts" (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014, p. 10).

This definition of an occupational task again suggests, at first, a broad notion of competence. However, the facilitator's manual defines the meaning of product, service, occupational responsibilities, and contexts, which it can be argued narrows the definition of competence towards task performance. The product is identified as the "physical or digital product or the

service rendered", which requires disciplinary or conceptual knowledge, theory, and information for its production (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014, p. 14). Occupational responsibilities are a cluster of practical skills required to produce a specific product or service (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014). Finally, occupational context identifies the location(s) where the product, service, or business process is performed (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014, p. 25). What can be observed in the further specification is that each element—production, service, and occupational responsibility—is intended to situate the task in relation to the product and service with the specific practical skills and knowledge to perform the task.

6.2.1 What the General Guidance and Regulatory Instructions Show

At first glance, the general guidance and regulatory instructions for occupational standards—as defined in this section—seemingly adopt a broad notion of competence in the tasks related to an occupation, compared to the previous, narrow focus on task performance in learning outcomes (described in Chapter 2, Section 2.2.1 p. 25), as a starting point for the intended curricula. But what the evidence shows—as just discussed—is that the regulatory instructions further narrow competence to task performance by specifying product, service, occupational responsibilities, and context. An example from the first intended curriculum for plumber, discussed in the next section, shows how the translation of general guidance leads to task performance-focused occupational standards that are used to derive the curriculum contents. The example shows the presence of CBT approaches in the close alignment of the occupational standards and curriculum contents, in a manner similar to what Shalem et al. (2004) have called outcomes-based alignment (in Chapter 2, Section 2.4 p. 34).

It is essential, however, to note a small variation between occupational and outcomes-based qualifications. The difference lies in the grouping of occupational standards/tasks under an occupational profile versus the use of learning outcomes based on discrete tasks in competency-based training (as seen in Chapter 2 Section 2.2.1 p. 25). The occupational profile contains the "occupational purpose and occupational tasks performed by practitioners of the occupation" (QCTO, 2014b, p. 10). The facilitator's guide stipulates that "the occupational profile forms the unit of analysis for the development of learning modules (module specifications) for the three curriculum components as well as the external summative assessment specifications" (QCTO,

2014b, p. 10). The three curriculum components are knowledge, practical skills, and work experience modules. The question arises as to the extent to which using the group of main tasks performed in an occupation as the basis for a qualification and first intended curriculum differs from using discrete tasks as the basis of units to form an outcomes-based qualification. In the next section, which dissects an example from the first intended curriculum, the evidence shows that there is no significant difference between the use of occupational standards in deriving the first intended curriculum in occupational qualifications and the use of learning outcomes in design down to derive curriculum contents in competency-based training.

6.3 Learning Outcomes and Design Down Methods: First Intended Curriculum

This section shows how an occupational standard/task is broken down into smaller tasks required for the main task's performance in the first intended curriculum. Developing the first intended curriculum involves deriving the knowledge, practical skills, and work experience modules relevant to performing the smaller tasks. The method for breaking down occupational standards and deriving the first intended curriculum has similarities to the CBT methods of learning outcomes and design down, where tasks are used to derive the contents for the knowledge, practical skills, and work experience modules. A significant critique of competency-based training relates to how the centrality of task performance translates into the curriculum in a manner that fragments learning by focusing on task performance at the expense of knowledge (Shalem et al., 2004; Wheelahan, 2015).

The example dissected in this section, from the first intended curriculum for plumber, shows how the breakdown of occupational standards into smaller tasks in the process of deriving curriculum content restricts the types of knowledge in the curriculum contents. Plumber Expert 2, in their interview, reflected on the example of water pressure from the plumber occupational qualification, providing insight into the restrictive nature of the template for the first intended curriculum. The example shows how the general guidance (discussed in the previous section) is translated through a process of deriving curriculum content guided by the facilitator's manual, which contains instructions for using the template provided by the QCTO. Here, I show that breaking down the occupational standard into smaller tasks and deriving the first intended curriculum from these, is similar to the learning outcomes and design down methods used in CBT approaches (described in Chapter 2 Section 2.2 p. 24), which leads to restricting the types of knowledge (disciplinary

knowledge, knowledge by acquaintance, and practical knowledge) to the procedural, contextual knowledge that is required for task performance.

Plumber Expert 2—a member of the community of expert practitioners with over four decades of experience in plumbing practice and training—used water pressure to illustrate a whole practice area associated with theoretical knowledge connected to all aspects of the practice of plumbing. The occupational first intended curriculum document outlines a work experience statement and occupational profile with occupation standards (discussed later). The occupational standards are then further specified in terms of their associated content for the knowledge, practical skills, and work experience modules. The work experience statement and occupational profile are almost identical to the work experience module. Here, the example of water pressure follows the same sequence as the plumber occupational qualification curriculum document. In explaining the example, I draw on concepts from Chapters 2 and 3 to show how the restriction of types of knowledge occurs in relation to the focus on task performance.

Chapter 2 on competency-based training explained how learning outcomes that are designed down into curriculum content lead to a prioritisation of procedural knowledge over disciplinary knowledge. Chapter 3 explained how a part of occupational capacity is the ability to apply inferential comprehension within the body of systematically organised knowledge (disciplinary knowledge, knowledge by acquaintance, and practical knowledge) that underpins practice in a profession or occupation. I showed conceptually that the development of occupational capacity is the ultimate requirement for training to practice in an occupation. Below, the example of water pressure from the plumber occupational qualification's first intended curriculum provides insights into how types of knowledge are restricted in the regulatory instructions for the template. In this section, I have chosen to dissect an example from the first intended curriculum for plumber, though I also provide an example from the first intended curriculum for electrician at the end of this section—albeit without explanation. The decision to discuss only one example in detail here is based on a desire to avoid repetition that does not further deepen the analysis. The repetition would occur because the format for the first intended curricula for both plumber and electrician are based on the same regulatory template, and thus, there is no significant difference to explore.

The excerpt for Example 1 (Figure 6.4 p. 97) is drawn from the curriculum document for the plumber occupational certificate, which can be found on the QCTO website (Institute of Plumbing of South Africa (IOPSA), 2018). In Figure 6.4 (Example 1), water pressure is an

occupational responsibility that is part of a broad occupational standard of "Installing, maintaining and testing cold water systems and hot water systems". The focus of the occupational standard is on task performance, i.e. on the tasks of "installing, maintaining and testing" for "operational cold and hot water systems". As explained in the previous section, in the facilitator's manual, the occupational standard structure that follows is further defined in terms of product or service, occupational responsibilities, and one or more occupational contexts. The example of water pressure—Figure 6.4 below—shows that the occupational context under the occupational standard/tasks is part of the work experience statement, which is further broken down into smaller tasks. One of the smaller tasks is to "Install hot and cold pressure water pipes and pipe fittings", which shows how water pressure in work experience—more specifically in occupational practice—is defined within the performance of the task of installing water pipes and pipe fittings.

Occupational Standard:
Installing, maintaining and testing cold water systems and hot water systems.

Unique Product or Service:

Effective and operational cold and hot water systems

Occupational Responsibilities:

Install, maintain and test cold water and hot water systems

Occupational Contexts:

Procedures and processes for installation and maintenance of cold water and hot water systems

Work Experience Statement: [provided 1 example]
Procedures and processes for installation and maintenance of cold water and hot water systems, [where one of the smaller tasks is]:

Install hot and cold pressure water pipes and pipe fittings

[Title of] **Knowledge module** [specifically for water pressure]
Hot and cold-water systems
[Specifies one topic related to water pressure amongst other] topics:

Principles and procedures for the installation of hot and cold pressure water pipes and pipe fittings
[where the further specification of the topic is found:]

- Regulations and Codes of Practice
- Procedures and methods of joining different types of pressure water pipes
- Procedures and requirements for the laying of pressure water pipes
- Testing procedure

Internal Assessment Criteria and Weight

- Discuss the three most common methods of joining pressure water pipes.
- Explain – step by step – how to solder copper pipes.
- Explain how GMS piping is joined together.
- Explain the mechanical compression fitting method for joining HDPE pipes and fittings.
- Discuss measures to protect pipes from temperature change.
- Discuss the laying of pressure water pipes: underground; above ground; under wall and under surface beds; in or through floors, concrete slabs or walls

[The **practical skills** module name for water pressure is:]
Install cold water and hot water pipes and pipe fittings.

[Under] procuring and laying different pipes–

- Lay Pressure water pipes: underground; above ground.
- [together with] embedded knowledge:
  Procedures, techniques and methods of laying pressure water pipes underground; above ground

[The **work experience module** is]: Install hot and cold pressure water pipes and pipe fittings.
Where the similar scope of skills above, the] Scope of Work Experience [includes tasks related to] joining different kinds of pipes, using and installing compression fittings– [an example for water pressure is:]

- Testing of pressure water pipes

11 Figure 6.4 Example 1: Water Pressure, from the First Intended Curriculum for Plumber

The next phase is to derive the contents of the first intended curriculum. The knowledge module for the occupational standard of "Installing, maintaining and testing cold water systems and hot water systems" contains occupational responsibilities related to water pressure, which are then

further expanded upon in relation to the content of the knowledge, practical skills, and work experience modules. Figure 6.4 (Example 1 p. 97) shows the structure of the knowledge module derived from the occupational standard for water pressure. The topic of water pressure is found in the knowledge module called "Hot and cold-water systems", which draws from the occupational responsibilities of the occupational standard in Example 1.

Under the title of the knowledge module, there are several topics—as seen in Figure 6.4 (p. 97). The knowledge module lists the topics necessary for the smaller task's performance as part of the occupational standard/task, which is identified earlier as "Install hot and cold pressure water pipes and pipe fittings" under occupational responsibility. Deriving from the smaller tasks, the knowledge topic in Example 1 (Figure 6.4 p. 97) is "principles and procedures for installing water pressure pipes and fittings". The knowledge topic is further broken down into sub-topics that form the guidance for content in the knowledge modules. The sub-topics guide the knowledge contents through keywords such as "regulations and codes of practice", "procedures and methods", and "requirements and testing for laying and joining water pressure pipes". The keywords for the knowledge module are not necessarily guiding the curriculum content towards the broader disciplinary knowledge areas that underpin calculations to lay and join water pressure pipes. Instead, the keywords emphasise the procedural knowledge needed to perform the task, prioritising the regulations, codes, procedures, methods, and testing needed to lay and join pipes, rather than the larger disciplinary bodies of knowledge. The assessment criteria for the knowledge topic further support the contention that procedural knowledge is emphasised, with testing focusing on the knowledge necessary for task performance, as evident in questions such as "discuss the three most common methods of joining pressure water pipes" or "Explain – step by step – how to solder copper pipes".

After the knowledge modules, the contents of the practical skills modules are developed in line with the occupational standards. In Example 1, the practical skills module associated with the occupational standard of "Installing, maintaining and testing cold water systems and hot water systems" is "Install cold water and hot water pipes and pipe fittings", which contains occupational responsibilities related to water pressure. The skills are listed according to the tasks that need to be performed. I chose a task related to water pressure to show one example of how, within the scope of practical skills, each practical skill is associated with embedded knowledge, as shown in Figure 6.4 (Example 1 p. 97). Under this practical skills module, laying pressure water pipes is defined as a task under the scope of the practical skill of "procuring and laying different pipes".

What is notable here is the reference to embedded knowledge focused on the performance of the task, which has already been analysed earlier in the knowledge module: "Procedures, techniques and methods of laying pressure water pipes underground; above ground".

Similar to the practical skills module in the previous paragraph, the work experience statement in Figure 6.4 (Example 1 p. 97) leads to the work experience module, which outlines smaller tasks that the student must be able to perform under the broader task of "install hot and cold pressure pipes and fittings", which relates back to the occupational standard of "Installing, maintaining and testing cold water systems and hot water systems". The "Scope of work experience" includes the task of "joining different kinds of pipes, using and installing compression fittings", where a task for water pressure is "testing water pressure pipes"—which the student must perform in the work experience module.

In Figure 6.4 (Example 1 p. 97), the knowledge, practical skills, and work experience modules are identified because they are required to perform a task under the occupational standard, i.e. the installation of hot and cold pressure water pipes and pipe fittings. As mentioned earlier, this example of water pressure from the plumber occupational qualification has been drawn from an interview with Plumber Expert 2, who was generally satisfied with the combination of knowledge, practical skills, and work experience modules used in the first intended curriculum. Plumber Expert 2's sentiments were reflected in all the other expert interviews with members of the community of expert practitioners. Nevertheless, when I pressed Plumber Expert 2 further on the process, concerns regarding the template came to the fore.

The problem appears to originate in the restrictive nature of the QCTO templates for an occupational qualification and its first intended curriculum. The template structure of the first intended curriculum is contained in the just discussed example of water pressure, where the occupational standard/task is designed down into knowledge, practical skills, and work experience modules.[9] The comment below, made by Plumber Expert 2, needs to be understood bearing in mind the profile of the community of experts (practitioners, trainers, and assessors) for the plumber occupational certificate, with decades of experience as plumbers and trainers altogether.

[9] The templates for the curriculum framework are found in a detailed manual for the workshop facilitator. There are instructions for each area of development. For example, the occupational profile with the occupational standards has specific instructions on how to formulate occupational standards—in this case, both detailed instructions and examples are provided. I have used the example of water pressure to illustrate the kind of contents the instructions lead to, rather than outline the individual instructions in the manual.

Here, Plumber Expert 2 explains how the qualification needed to be trimmed and changed to meet the requirements of the template:

> You had many experts or previously qualified plumbers who then put together a curriculum in terms of this is the new curriculum, and this is an improvement. Then that had to be shaved down into the template given by QCTO. It had to change in terms of wording and definitions, and explanations to match the requirements of the QCTO by your Quality Development Facilitator.

Plumber Expert 2's account shows how the curriculum contents, based on the knowledge of the community of expert practitioners, were reduced, as the definitions and explanations were standardised to meet QCTO requirements. The nature of the reduction of curriculum content and standardisation of language indicates that the first intended curriculum is not a reflection of the full scope of the intended curriculum content that underpins practice. The reduction of knowledge types for systematically organised knowledge owes to how knowledge, practical skills, and work experience contents were derived for the performance of the task of "Install[ing] cold water and hot water pipes and pipe fittings"; instead of being derived by foregrounding the systematically organised knowledge—disciplinary knowledge, knowledge by acquaintance, and practical knowledge—for understanding water pressure and the development of inferential comprehension abilities leading to occupational capacity (as a plumber) to "Install cold water and hot water pipes and pipe fittings". In other words, the reduction of knowledge types is due to the focus on what is necessary for the performance of occupational standards/tasks. Example 1, together with Plumber Expert 2's experience, shows that the focus on task performance reveals a template that restricts knowledge types to procedural, contextual knowledge for the first intended curriculum—one that requires the alignment of content and occupational standards/tasks in a manner similar to that identified by Shalem et al. (2004, p. 53) in their analysis of outcomes-based qualifications, i.e. "quality assurance which regulates curriculum design and programme evaluation through a content/outcome alignment, marginalises discipline knowledge and, as a result, offers highly superficial regulation".

The assessment criteria, which form part of each module in the first intended curriculum, exacerbate the above problem of the reduction of knowledge types, with a restrictive template. The QCTO templates require structuring the occupational qualification and first intended curriculum to align with the assessment outcomes. For example, Plumber Expert 2 described how understanding water pressure is required for every aspect of plumbing practice and is typically

taught with principles such as elevation (height of buildings) and gravity. They agreed with the other expert practitioners that water pressure needed to be taught over the three years of the training, with the complexity increasing as the student built on other knowledge and skills developed in related areas. However, as Plumber Expert 2 explained, the regulatory body, i.e. the QCTO, interceded and suggested that water pressure be covered under a single assessment criterion in one particular year to meet the template's requirements. What Plumber Expert 2 highlighted is the problems with developing curriculum content in line with the achievement of a single assessment criterion for water pressure which contains all the knowledge, practical skills, and work experience content ; especially when the teaching and learning of systematically organised knowledge might not fit into single assessment criterion.

Occupational Standard:
Installing, wiring, connecting electrical equipment and control systems

Unique Product or Service:
Installed equipment and control systems

Occupational Responsibilities:
Install and repair wire-ways
Install, wire and connect electrical equipment and control systems

Occupational Contexts:
Processes of installation, wiring and connection of electrical equipment and control systems

Work Experience Statement: [provided 1 example]
Install, wire and connect electrical equipment and control systems under the direct supervision of a qualified electrician [where one of the smaller tasks is]:

Install and secure wire ways

[Title of] Knowledge module [specifically for installation of wiring]
Wire ways and wiring
[Specifies one out of 3 topics for installation] topics:

Wiring of installations (35%)
[where the further specification of the topic is found:]

- Regulations and statutory requirements for wiring of premises
- Electrical diagrams and symbols
- Electrical components and their applications

Internal Assessment Criteria and Weight

- List, identify and explain the meaning of all standard International Electrotechnical Commission (IEC) wiring symbols given on work drawings

[The practical skills module name for wire way installation is:]

Install wire-ways

[Under] The learner will be required to:

- Confirm the selection and installation method of the selected wire ways
- Use installation tools and equipment
- Design and install wire ways
-

[The work experience module is]: Processes of installing, wiring and connecting of electrical equipment and control systems,
Where the similar scope of skills above, the] Scope of Work Experience [includes tasks related to] Install, wire and connect electrical equipment and control
systems under the direct supervision of a qualified electrician– [where installation of wire ways occurs:]

- Install and secure wire ways

12 Figure 6.5 Example from the First Intended Curriculum for Electrician (Excerpts)

As discussed earlier, the example above in Figure 6.5 is found on the electrician first intended curriculum is based on the same standardised template as the Figure 6.4 from the plumber first intended curriculum. The example is provided without an explanation as the QCTO standardised

templates ensure the same format and thus, further analysis will not deepen an understanding of the first intended curriculum.

6.3.1 What the First Intended Curriculum Structure Shows

What this section shows, through the example of water pressure, is the result of the regulatory instructions for defining occupational standards in the facilitator's guide, which has two similarities with CBT approaches. First, the composition of an occupational standard/task shows how an initially broad definition of competence is captured by a further specification of product or service, occupational responsibilities, and contexts. There are similarities between the further specification of an occupational standard and the solutions to competency-based training's narrow focus on tasks that ultimately resulted in what Wolf (2001) argued were long, unwieldy definitions of competence statements/standards. Second, the QCTO assumes that curriculum content can be derived from task performance, focused in the example here on "Installing, maintaining and testing cold water systems and hot water systems". This assumption is similar to the observation made by Shalem et al. (2004) about outcomes-based quality assurance, where there is an underlying assumption that outcomes can communicate conceptual/disciplinary knowledge and that practical skills can be communicated through the statement of a task. The problematic assumption is that curriculum contents can be communicated through the statement of a task, albeit a broad occupational task.

The previous section showed how general guidance and regulatory instructions for occupational standards point to policy intention and regulatory guidance that initially seems to strive for a broad notion of competence. For the QCTO, this broad notion of competence is embodied in the occupational standards/tasks grouped under an occupational profile. However, the analysis of Example 1 (water pressure) reveals the centrality of task performance in defining the occupational standard, where the notion of competence is narrowed by the further specification of product/service, responsibilities, and work context. Although an occupational standard's composition is not identical to that of a competence statement, it draws on principles of task performance with a logic similar to that of CBT approaches. As described by Plumber Expert 2, the result is a first intended curriculum template that reduces curriculum content in line with a single assessment criterion, which uses standardised definitions and terms that may not reflect the intended meaning. The result is the assessment of task performance, rather than consideration of how types of knowledge underpin the occupational capacity necessary for practice.

This example (of water pressure) from Plumber Expert 2 shows that trimming and reframing in terms of words and definitions to match the regulatory body's template reduces the scope and depth of the knowledge covered by the programme to procedural, contextual knowledge. The restriction occurs by reducing water pressure to a single assessment criterion, where related content must be covered in a year; as opposed to allowing for multiple assessment criteria on water pressure, based on the scope and depth of types of knowledge found in systematically organised knowledge over the duration of the programme, to develop an understanding of the complexity of water pressure in relation to knowledge and practice.

As noted in Chapter 5, an occupational qualification and its first intended curriculum are finalised under the aegis of the actor that oversees the development process and then checked by the regulatory body, i.e. the QCTO. Once the South African Qualifications Authority has accredited the occupational qualification, public colleges can use the available first intended curriculum for their learning programmes. However, as explained in Chapter 5 Section 5.2.2. (p. 80), the plumber and electrician occupational qualifications went through the process of developing a second intended curriculum. The following section explains a specific second intended curriculum, called the national occupational content curriculum or NOCC. In analysing the second intended curriculum, what becomes more evident is how the task-based first intended curriculum could be interpreted for a more explicit intended curriculum. While the evidence from the first intended curriculum, discussed in this section, shows how CBT approaches were used to reduce knowledge types to the procedural, contextual knowledge necessary for task performance, the evidence from the second intended curriculum, discussed in the next section, shows how sequencing the curriculum content by work tasks further breaks down systematically organised knowledge necessary for teaching and learning processes.

6.4 Learning Outcomes and Design Down Methods: Second Intended Curriculum

As Policymaker 1 explained, the idea behind occupational qualifications and their associated intended curricula is to provide specifications for curriculum content to guide colleges, by providing the requirements for knowledge, practical skills, and work experience (discussed further in Chapter 7). Policymaker 2 and Facilitators 1 and 2 are associated in various ways with the NPO responsible for the second intended curriculum, to develop its structure. Similar to Policymaker 2, Facilitator 1 explained the problem with the first intended curriculum (curriculum framework) and

the purpose of the second intended curriculum thus: "people don't really know how to take the qualification [curriculum] framework and put into an implementable training or learning program".

Key members of the group involved in developing the second intended curriculum structure also highlighted several current problems with training at colleges. For example, Facilitator 1 described the problem that has just been described above as one that is being experienced in colleges, and which the second intended curriculum structure and development process were attempting to address. Central to their understanding of the problem at colleges is that apprentices are not able to apply theory; both Facilitator 2 and Policymaker 2 agreed with Facilitator 1's explanation of the problem with apprentices: "apprentices actually don't really know what they're doing, and they can just regurgitate information, but they can't really apply what they've learned".

This explanation is instrumental to the underpinning ideas about how the second intended curriculum process could influence curriculum content for trade-based occupations. The explanation provided by Facilitator 1 reveals an underlying assumption in the evidence presented in this section. The assumption is that the contents of the more explicit curriculum need to be task-based because the performance of more tasks by apprentices will lead them to "apply what they've learned" and to greater understanding of "what they're doing" in the workplace. The second intended curriculum structure was developed by consultants with links to the Department of Labour and an NPO organisation, which provides insights into how the first intended curriculum could be interpreted for use in the classroom. This section, which presents evidence on the second intended curriculum, shows the logic of deriving a more explicit intended curriculum from the first intended curriculum. I will show further evidence on how the intended curricula are tightly tied to learning areas focused on the main tasks performed in the occupation. The evidence will thus show that the method of deriving the second intended curriculum has similarities to the CBT approaches of learning outcomes and design down, which further entrenches CBT logic in the intended curricula.

The structure of the second intended curriculum is described as a "situated contextualised learning approach", which is based on learning projects that are work tasks (Facilitators 1 and 2). Facilitator 2 discussed the second intended curriculum structure as: "project-based learning and everything needs to be around a learning project". Facilitator 1 further explained what project-based learning is:

> in practice, this looked like a situated contextualised learning approach where whatever you're learning needs to be related to an actual work scenario so that you get, kind of like, a case study scenario. Okay like and, then whatever you then attach in terms of [the] knowledge module, [and the] practical skills module needs to kind of feed into resolving that scenario.

Building on Facilitator 1's explanation, Facilitator 2—quoted below—broadly explained the second intended curriculum structure, which is built on work scenarios as learning projects that include the knowledge and practical skills modules. Thus, the first part of the workshop to develop the second intended curriculum is to identify the learning areas that are the main occupational tasks. Facilitator 2 further explained:

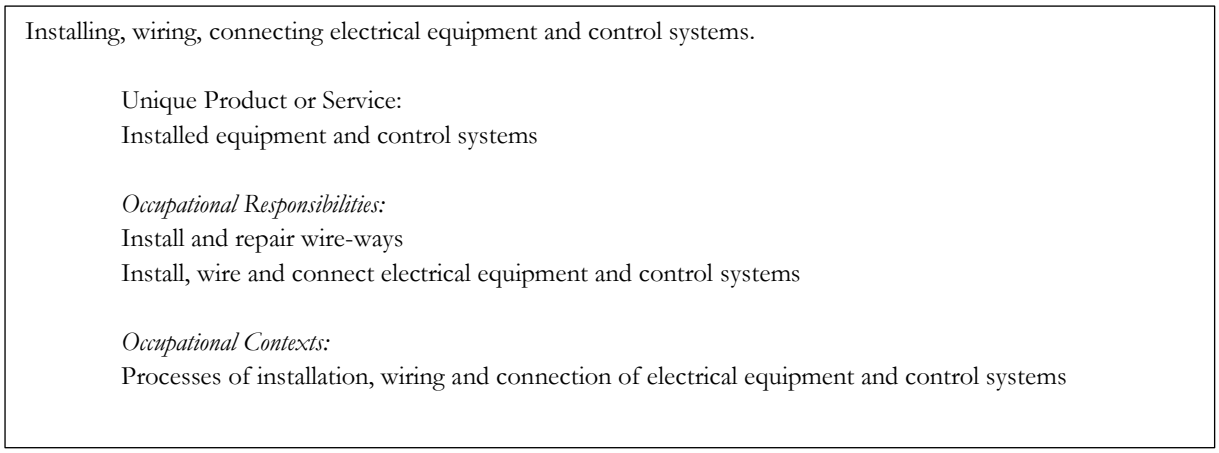
> You actually structure the training program where you drive everything by occupational tasks. Like, industry totally gets it …[and] they get on board with it. But there are many [education] providers, they just, like, they can't get their head around that because they have, all their whole thinking, is around subjects and, you know, lesson plans.

This explanation by Facilitator 2 suggests that the second intended curriculum structure is driven by industry's understanding of occupational tasks in a job description rather than by an educational understanding of curriculum content driven by subjects and lesson plans. I asked Facilitator 2 to further expand on the design of the second intended curriculum structure, and they used the example of a bicycle to show how task performance informs the curriculum contents:

> So essentially, when you would design the curriculum for qualification, for example, for the Electrician, you would actually first list occupational tasks. And once you had the occupational tasks stipulated, you would then say, well, in order to be able to assemble a bicycle, what do you need to know? In terms of the theory to assemble a bicycle? What do you need to practically be able to do in order to assemble a bicycle? And what work experience do you usually actually require in order to become, you know, kind of experienced and competent in the same thing, [assembling] a bicycle?

I will now show the nature of the design down within the learning areas through the use of Examples 2 and 3, which are direct excerpts from the first intended curriculum and the draft second intended curriculum for electrician. As in the earlier example of water pressure from the first intended curriculum for plumber (Example 1), the first part of the process entails the specification of the occupational standards/tasks. In Example 2, the focus is on the occupational

standard/task of "Installing, wiring, connecting electrical equipment and control systems" in the first intended curriculum for electrician, as seen in Figure 6.6.



13 Figure 6.6 Example 2: Occupational Standard from the First Intended Curriculum for Electrician

In Example 2, I further focus on the first occupational responsibility of "Install and repair wire-ways". The occupational standard under which this occupational responsibility falls has associated knowledge, practical, and work experience modules in the first intended curriculum. Similar to Example 1, but in more detail, Example 2 shows that the learning areas are focused on smaller tasks for the performance of the large task of "Install and repair wire-ways".

The identification of occupational tasks takes the form of learning areas that are outlined in an overview document for the second intended curriculum for electrician. As seen in Figure 6.4 (Example 2 p. 108), the learning areas—referred to as LA—designated to "Install wire ways" focus on the basics of preparation, the use and care of tools, and installation in the beginning phase; and on designing, installing, wiring, maintaining, and troubleshooting systems and motors in the middle phase.

From Beginning Phase 1:
LA1: Prepare for work
LA2: Use and care of basic trade specific hand- & power tools and equipment
LA5: Install wiring systems and accessories (for low voltage) in domestic buildings and premises
LA6: Install wiring systems and accessories for low voltage in industrial and commercial buildings and premises
LA7: Install wire, test and maintain electrical motors and associated control systems – Basic

From Middle Phase
LA9: Design, install, wire, maintain and troubleshoot electrical motors and associated control systems

Knowledge Modules (Links between first and second intended curriculum)

QCTO Occupational Certificate	National Occupational Curriculum Content
671101000-KM-05: Wire ways and wiring (NQF Level: 4) Credits: 11	LA1 LP7, LA5, LA6
KM-05-KT01: Wire ways (35%)	LA1 LP7, LA5, LA6
KM-05-KT02: Wiring of installations (35%)	LA1 LP7, LA5, LA6
KM-05-KT03: Earthing and bonding (30%)	LA1 LP9, LA5, LA6

Practical Skill Modules Links between first and second intended curriculum)

671101000-PM-04, Install wire-ways, L4, Cr5	LA5, LA6
PM-04-PS01: Confirm the selection and installation method of the selected wireways	LA5 LP1-2, LA6 LP1-2
PM-04-PS02: Use installation tools and equipment	LA5 LP1-2, LA6 LP1-2
PM-04-PS03: Design and install wire ways	LA5 LP1-2, LA6 LP1-2

14 Figure 6.4 Example 2: "Install wire ways" Learning Areas, and Overview of Second Intended Curriculum for Electrician

In Figure 6.4 (Example 2), I have used an excerpt to show an overview of how the modules in the second intended curriculum (LA1, LP7, LA5, LA6) are aligned to modules in the first intended curriculum ("KM-05: Wire ways and wiring"). The excerpts from the second intended curriculum templates organise the learning areas, and use the knowledge and practical skills module contents from the first intended curriculum. Figure 6.4 shows how the focus on "installing wire ways" contains Learning Areas 5, 6, and 9, which include practical modules that identify the main tasks. Learning areas are composed of learning projects; for example, Learning Area 5 has several learning projects.

Next, I expand Example 2 in Figure 6.5 (p. 109) using an excerpt from the learning project, learning area, and practical skills focused on "install wire ways".

Learning Project 2: Install cables and conductors into wire ways
[Under which one example is given}
Learning project description: Install protection and control equipment into single-phase distribution boards

Practical Skills Modules Content
Reference to QCTO Curriculum
PM03, PM04, PM05 (Entirely)

Apprentices must do/perform the following (hard and soft skills):

Activity Phase: Planning/Preparation
Provide access to (Given):
Work tasks/job requests and material and equipment as specified in the last column;
Prepare for installation of cable and conductors
[2 examples provided of expectations]
- Identify, obtain and understand OHSA procedures for given instruction
- Identify health and safety risks and follow established risk control measure procedures in preparation for the work

Activity Phase: Implementation/Execution – [2 examples provided}
Follow OHSA risk control measures and procedures for carrying out the work
Install cables, conductors and accessories with sufficient excess to affect terminations
Activity Phase: Evaluation
Conduct continuity and installation resistance tests on installed wiring systems and conc
Activity Phase: Documentation
Rectify defects revealed through inspection and tests
Perform housekeeping on completion of task

15 Figure 6.5 Example 2: Learning Area, Learning Project, and Practical Skills Module Content

In expanding Example 2 in Figure 6.5, I focus on the learning project, "Install cables and conductors into wire ways". The organisation of the learning project is based on the performance of tasks connected to the contents of the knowledge, practical skills, and work experience modules of the first intended curriculum and their associated assessment criteria. Additionally, the learning project is related to didactical and methodological advice captured in the form of lectures or videos, and learning materials/tools and equipment, such as print materials or electronic files, software applications, Occupational Health and Safety Act (OHSA) Act 85 of 1993, and textbooks. The learning project is further described in terms of the equipment that is required, such as single-phase distribution boards. The learning project content shows how performing the task is prioritised in the practical skills content (I discuss the embedded/underpinning knowledge for the practical skills in the next paragraph). The focus on task performance is found in how the learning project contains the contents of the practical skills module of the first intended curriculum and outlines the three phases of a work situation: planning, implementation, and evaluation. This three-phrase outline is a structure delineated in the second intended curriculum templates. The learning

project is where the student performs the task—"install wire ways"—while the practical skills requirements are framed in the three phases of a work situation.

Similar to Example 1 (Figure 6.4 p. 97), in Example 2, the focus of the learning project in the second intended curriculum for electrician—as seen in Figure 6.5 (p. 109)—shows that knowledge is referred to as underpinning knowledge. The use of the "underpinning knowledge" appears in Figure 6.6 (p. 111) as "General requirements applicable to the installation of wiring systems", which include the statutory and regulatory requirements—highlighting procedural, contextual knowledge. In addition, the use of "applicable" suggests that the types of knowledge have been narrowed down to only that knowledge which is relevant to the performance of the learning project, and this is further highlighted by the list of knowledge requirements including items such as "Wiring support and/or protection requirements and specifications" and "Relevant manufacturer requirements". The underpinning knowledge has a clear connection to the work experience module requirements for the learning project: underpinning knowledge requirements, such as "Wiring support and/or protection requirements and specifications" and "Wiring support techniques and alternatives", are clearly associated with requirements of the work experience module such as "Secure conductors and cables". This reveals how the practical skills become part of the work experience, where specified work tasks are to be performed under supervision.

Underpinning Knowledge Module Content
[QCTO Knowledge Module:] KM05
Knowledge of: [only 1 example is provided]

General requirements were applicable to the installation of wiring systems, incl.:

- Statutory and regulatory requirements associated with the installation of electrical conductors and cables
- Wiring support and/or protection requirements and specifications
- Relevant manufacturer requirements
- Specifications and methods for installation of conductors and cables
- Wiring support techniques and alternatives
- Marking, tagging and labelling requirements for cables, wires, conductors and connections
- Tests for wiring and connections
- Cable and conductor types, sizes and quality (as per SANS 10142-1)
- Calculation of estimated load and volt drop as per SANS 10142-1
- Use and application of personal protective equipment for installation of conductors and cables

Work Experience Module Content
(Exposure to be given)
[QCTO Occupational Qualification Content] WM01, WM02,
Under supervision:

- Plan the layout of wire ways as per work requirements
- Draw in cables and conductors
- Secure conductors and cables
- Perform continuity and installation resistance tests on existing installations
- Report results of testing to supervisor and discuss

16 Figure 6.6 Example 2: Learning Project "Install cables and conductors into wire ways", with Knowledge and Work Experience Module Content (Excerpts)

With regard to Example 2 of installing wire ways, the following question arises: would a learning area and learning project be structured differently if the module from the first intended curriculum were more theoretically oriented? I have provided Example 3 of Learning Area 1 (Prepare for work), which shows that rather than focus on aspects of electrical theory, the learning area too is structured on the performance of a task. In Example 3, in Figure 6.7, the knowledge area of the learning project is focused on applying electricity fundamentals, and basic electrical and mechanical engineering principles and prioritises the application of theory.

Learning Area 1: Prepare for work.
Learning Project 8: Apply fundamentals of electricity and basic electrical and mechanical engineering principles in trade-related tasks
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):
LA 1 - L.P.: 1, 7
Learning project description: Apply fundamentals of electricity and basic electrical and mechanical engineering
principles in trade-related tasks

Underpinning Knowledge Module Content
QCTO Module: KM-03-KT01
Knowledge of:

- Principles and fundamental concepts of electricity
- Concepts and production of electricity (Inc.)
  - Magnetism
  - Basic transformer principle
  - Understanding resistance, current and voltage
- Conductors and insulators
- Ohms law (Resistive circuits only)
- Kirchhoff's laws
- Alternating current theory (incl. generation of electricity)
- Direct current theory
- Definitions, types, properties and applications of conductors, insulators and semiconductors
- Concepts, theories and principles of Electrical Circuits
- Basic trade calculations incl.:
  - Mathematical calculations, linear measurement, areas, volumes, ratios
- Basic engineering principles, incl.:
  - Basic physical quantities, concepts, principles, S.I. units, mass, velocity, acceleration, force, weight, density, angles, energy/work/power, moments/torque, centre of gravity, mechanical advantage, levers, etc.

[The] Criteria for assessment:

- Correct explanation of relevant principles
- Correct calculations

17 Figure 6.7 Example 3: Learning Project "Apply fundamentals of electricity and basic electrical and mechanical engineering principles in trade-related tasks", with Underpinning Knowledge Module Content

Similar to Example 2, in Example 3, as shown in Figure 6.7, the content of the underpinning knowledge module in the second intended curriculum is focused on topics drawn from the knowledge module of the first intended curriculum. The list of knowledge topics seems to separate the theory and calculations. Additionally, there are separate assessment criteria for the theory and calculations. The assessment criteria for the knowledge content in this learning project suggest that the theory and the application of calculations are separated in assessment and hold similar weight in the curriculum. However, what is not communicated clearly in the assessment criteria is that "correct calculations" are based on "correct explanations of relevant principles". When learning a

systematically organised body of knowledge on electricity, and electrical and mechanical engineering, or more generally theory, the student needs to have an understanding of the conditions (embodied in the "relevant principles") in which to apply the calculations that stem from the body of knowledge. In the method of framing the theory as a list of topics, with assessment criteria that list correct explanations of principles and correct calculations separately, what is missing is the connection between how a body of knowledge informs the calculations that need to be performed in various work scenarios. This is different from the account of specialised knowledge detailed in Chapter 3, where the practice of work is understood to be based on inferential abilities based, in turn, on making connections between know-how and know-that in systematically organised knowledge.

My conclusions from Example 3 (p. 112) require some reflection on the insights gained from observing a two-day workshop for the second intended curriculum for an IT occupational qualification. During the workshop, I observed that foregrounding a work task in learning areas and learning projects led to framing of the embedded/underpinning knowledge for the task in the learning projects, in a way similar to that found in Example 3. What I am highlighting in Example 3 is that there is a problem with an approach that identifies the work tasks first and then the associated underpinning knowledge necessary to perform the work tasks. Taking this approach focuses the curriculum content on, for example, performing the correct calculations for a lighting installation, instead of acquiring the disciplinary knowledge on electrical, and electrical and mechanical engineering. Similarly, in the workshop I attended, I observed that in defining a work scenario such as "installing a computer" and then drawing out the underpinning knowledge, the focus was on "correct" cable lengths for the installation of the computer, rather than on a basic understanding of computer hardware and electrical systems.

What is confusing in Example 3 (p. 112), with reference to the learning area of "Apply fundamentals of electricity and basic electrical and mechanical engineering principles in trade-related tasks", is how the second intended curriculum structure is applied to curriculum content relating to disciplinary knowledge. The learning area focuses on work tasks in a learning project, with underpinning knowledge and practical skills modules. The confusion is illustrated by expanding Example 3, as seen in Figure 6.8 (p. 115), in which the practical skills module uses the "plan, evaluate and execute framework" for "correct calculations". Figure 6.8 shows how the emphasis on "correct calculations" flows from the knowledge module to the practical skills

module, where in the implementation and execution, the student must perform calculations in the context of "different scenarios and technical drawings".

Practical Skills Modules Content
Reference to QCTO Curriculum

-

Activity Phase: Planning/ Preparation
Provide access to (Given):
Different scenarios and drawings;

Apprentices must be able to do/perform the following (hard and soft) skills:

- Determine the different forms of energy
- Explain the difference between alternating and direct current and the underlying principles
- Explain the basic transformer principle
- Explain the concepts of magnetism, resistance, current and voltage

Activity Phase: Implementation/ Execution

- *Perform fundamental numerical calculations to solve routine electro-technological (incl. Ohm's law and Kirchhoff's law) and electro-mechanical problems*
- Calculate missing values from a given electro technical drawing
- Identify appropriate conductors and insulators and the relevant properties of related materials
- Explain basic electrical principles

Activity phase: Evaluation/ Documentation

- Evaluate and results against model answers
- Perform basic housekeeping of workstation

18 Figure 6.8 Example 3: Learning Project "Apply fundamentals of electricity and basic electrical and mechanical engineering principles in trade-related tasks", with Practical Skills Module Content (Excerpts)

In Figure 6.8, there are references to explanations of electrical theory in both the "Planning" and "Execution" phases; however, the focus is primarily on spending more time on performing calculations. Similar to Example 1 earlier, Example 3—i.e. Figures. 6.7. (p. 112) and 6.8 showing the learning project, "Apply fundamentals of electricity and basic electrical and mechanical engineering principles in trade-related tasks", with the content of knowledge and practical skills modules—shows how the content is almost identical and repetitively states the performance of a trade-related task, for example, a technical drawing with correct calculations. The evidence in Example 3 goes back to the assumption made about the second intended curriculum; that performing a task leads to apprentices "apply[ing] what they've learned", which leads, in turn, to greater understanding of "what they're doing" in the workplace. This assumption draws on CBT logic—i.e. the notion that what an individual can do (perform a work task) reveals what an individual knows (specialised knowledge)—which has given rise to much debate and critique in

the literature (as discussed in Chapter 2 Section 2.4. p. 34). The evidence in Examples 2 and 3 shows that the underlying assumption of the task-based approach to teaching and learning in the second intended curriculum equates understanding of systemically organised knowledge and task performance, where performing work tasks is taken to mean that the student knows and understands the "underpinning knowledge".

6.4.1 Observation and Interview Data on Development of the Second Intended Curriculum

The previous two sections have dissected examples from the intended curricula, taken from accredited and draft intended curricula documents. This section presents evidence from the observation of workshops and interviews with expert practitioners in the plumbing and electrical fields. It is worth recalling that the same expert practitioners developed the first and second intended curricula for both plumber and electrician. In the view of the expert practitioners, the development process for the second intended curriculum was a follow-up to the first intended curriculum development process; and they did not view the two processes as separate. Their view revealed and confirmed that the second intended curriculum was based on the contents of the first intended curriculum. The focus of the workshops on the second intended curriculum was on sequencing the first intended curriculum contents for teaching and learning. This section starts with my observations from the workshops, which are followed by the views of the expert practitioners.

As discussed in Chapter 5 and earlier in this chapter, I observed workshops for the second intended curriculum for an IT qualification. In the workshops, I observed how participants struggled with aligning—and more specifically, sequencing—the knowledge, practical skills, and work experience modules to learning projects within a learning area. My observation was that it was difficult to follow a set structure that divided the contents of knowledge, practical skills, and work experience into learning projects focused on task performance. At times, "more" knowledge was required for the learning project to occur, which meant "more knowledge" was required at the beginning of the programme than the template of the learning area/project allowed for. An example was "install an office computer", which requires broad knowledge of areas such as the technical aspects of the hardware, office electrical requirements, and occupational health and safety standards, to name a few. As described in Examples 1 and 2, the second intended curriculum structure of knowledge, practical skills, and work experience content within the learning area and learning project did not always align with the sequence and combination of different knowledge

and practical skills required to perform a learning project/work task. What became clearer in the workshop was how the second intended curriculum template, with its standardised time allocations for knowledge, practical skills, and work experience in a programme structure for each year, could be inflexible if "more knowledge" was required in a particular time period.

The problem with focusing on the structure of learning areas and projects that I observed in the workshops, was also noted in interviews. The three electrician experts and two plumber experts that I interviewed were broadly impressed with the structure of the second intended curriculum. All five agreed that the model integrated theory and practical skills that prepared students for the workplace. However, upon deeper reflection on different parts of the process, some highlighted how essential areas were at times compromised within the overall focus on learning projects. For example, Plumber Expert 2 reflected on the problem of focusing on the structure of learning projects thus:

> However, the biggest challenge that we then came about is that the NOCC [second intended curriculum] document required integrating theory and practice into a real-life situation... But with the NOCC – we then said hang on; we need to apply that knowledge that the individual has gained through his theoretical and simulated training in terms of going to Mrs. Brown's house, and she's complaining that when she opens the tap, the water is not coming out. Then the individual had to be competent to take his knowledge of pressure, pipe sizes and the rest of it and resolve that practical problem of there's no water coming out of the tap. And it's not just pressure, it could be something else or that type of thing.

In this reflection, Plumber Expert 2 highlighted the challenge of developing "real-life" work scenarios for learning projects, while at the same time agreeing that this was a positive element of the second intended curriculum, which prepared students for work. It may seem that Plumber Expert 2's explanation is contradictory, and therein lies the problem. While emphasising the need for a person to be competent, Plumber Expert 2 also highlighted how a problem found in at work can draw on different areas of the plumber's practice and knowledge. While the five experts who were interviewed agreed that preparing students for the workplace was essential, it was equally evident that capturing "work scenarios" in a curriculum was challenging. The problem could be that developing a task-focused learning project and closely tying the knowledge, practical skills, and work experience requirements might not represent how practice occurs on-site. Plumber Expert 2 explained that there was rarely work in which problem-solving required drawing on just one distinct area of knowledge. Their reflection—as quoted above—highlights how problematic

it is to define curriculum contents based on work tasks, when problem-solving on a work site requires abilities based on systematically organised knowledge. As discussed in Chapter 3 Section 3.3.1 (p. 42), Winch (2010) identified abilities, such as problem-solving, as being based in inferential comprehension, and this implies that both know-how and know could be required for what is framed as a work task in a learning project.

In the first instance, the community of expert practitioners I interviewed found the model innovative in terms of being based on integrated practical skills and knowledge. But when questioned in detail about their experiences, they reflected on the significant problems that they encountered in communicating the depth of knowledge and skill required for what might seem to be a minor work task. For example, Electrician Expert 1 noted that the focus on tasks became problematic when identifying the skill in communicating work tasks in the specific way that was needed for the second intended curriculum (emphasis added):

> South Africa in the training fraternity are sitting around a table with many people. Hmm, we got more hung up on the task, then we get hung up on the skill. Yeah, okay. And we are supposed to be skills development practitioners, not tasks development practitioners. This is where the [NPO] was kind of like failing a little bit … [with the] model in trying to get across what they were doing. They were so fast-paced that they weren't seeing the skill that needed to be required…
>
> So, what do I mean by that? If we look at the models that they were developing, we needed to do something practical. So, I need you to start with to the distribution board. A little bit of plugs, a little on lights and a cable in between and wiring and connect …But what was the skill that I needed to learn in it –
>
> > was the skill of being able to mount a box squarely on the wall?
> > was the skill the ability to terminate the cable in the circuit breaker?
> > was the skill, the ability to know how to connect the light plug?
>
> What was the skill that I needed to know for me to be able to do that? And if I didn't break the skills down, I would never be able to see past the task. So, *we kept on developing these tasks, but we were missing the skills* that needed to be done. And if I cannot see the skill, the qualification is supposed to talk to my skills to my skill set of what I need to do.

Thus, Electrician Expert 1 noted how focussing on the work task potentially hid the "skills" required to practice as an electrician. In this, Electrician Expert 1 was drawing on a much broader definition of skills, which is more in line with how Winch describes "know-how". In context of curriculum and assessment in the quote above, Electrician Expert 1 also explained the difference between assessment of task performance and assessment of a student's "skills" and "abilities". Their concern highlights how task performance as the only indicator for assessment might be inadequate: it does not provide the assessor with enough information about a student's understanding of what they have done. In contrast, assessing the steps a student takes to arrive at completing a task in the work place provides a richer understanding of the student's application of know-how, based in systematically organised knowledge and inferential comprehension abilities, one of which is problem-solving. Electrician Expert 1 was concerned with the know-how needed for the whole of practice, including a combination of knowledge and skills, as opposed to the successful performance of a task. The problem discussed here shows how focussing on something "practical" in a task, such as a distribution board, can lead to providing a little knowledge about everything such as plugs, lights, cabling, wiring, and connections—but this focus may not communicate the requirements for know-how. The above quote from Electrician Expert 1 needed some context because understanding how the full scope of know-how can be reduced in a task-focused approach, requires further explanation.

The main theme that emerges in this section, based on the evidence from workshop observations and interviews, is that basing and assessing curriculum contents on work tasks is problematic. The problem lies in how the practice that occurs in unpredictable scenarios does not easily translate into the work tasks that inform curriculum contents for the purposes of teaching and learning. One way to understand how assessment based on the performance of tasks is problematic is by considering Electrician Expert 1's explanation of how teaching and assessing the installation of luminaires (a complete lighting unit with a light source, socket, etc.), differs in a traditional knowledge-based model from an outcomes-based model of teaching and learning:

> When I install luminaires or teaching to install luminaire, what was different [from] installing luminaires in the unit standard based versus what I did when I did install luminaires in my module? Yeah, it was still installing luminaires. However, what changed was the methodology of how I measured the answer. So modular-based was that I needed to do these little things to get to the results.

> So, I taught him [the student], this is the luminaire. This is what makes up the luminaire. Okay. Now when I put it together, and I connect the power, the luminaire functions - the light fitting. In outcomes-based education – it was installing the luminaire, if you install the luminaire, when it works, when I switch the power on [and] you've done it to correct. But how you got there, this you really didn't need to know, it wasn't really my concern. So, in my training, I made sure that I kept the same module [methodology] because ultimately, you just had to install the luminaire. That was what you had to do to get there.
>
> When I look at the outcomes-based of the occupational qualification, from a training perspective, it's precisely the same. There is this install luminaire component, and I install it in teaching and training the same way. But my measurement now is that there are specific outcomes that he [the student] has to meet. So, I will make sure that during that process, I achieve those specific outcomes. That's what's changed, not the how. But the methodology in how we measure the result.

What Electrician Expert 1 is highlighting here is that assessing how a student installs a luminaire requires assessing the small steps the student takes (methodology) to install a working luminaire, which provides a better understanding of the student's know-how abilities. In contrast, unit standards prioritise assessment in which the student passes if the luminaire works. Such assessment only provides insight into the student's installation of one luminaire, rather than on the methodology that embodies the know-how of how the student installed a working luminaire—Electrician Expert 1 found this to be problematic. The problem, as noted by Electrician Expert 1, is similar to what Young and Gamble (2006) have highlighted as the weakness in competence-based training (as discussed in Chapter 2 Section 2.4 p. 35): it problematically equates what a student can do with what a student knows.

6.4.2 What the Data on the Second Intended Curriculum Shows

Examples 2 and 3 from the second intended curriculum for electrician thus show how learning areas with learning projects were framed using a method based around three phases of work: planning, execution, and evaluation. The learning areas focussed on the performance of broad tasks as learning projects, which were further broken down into the smaller tasks needed to perform the broad tasks. The knowledge, practical skills, and work experience content from the first intended curriculum, with additions made at workshops involving a facilitator and the expert practitioners, were aligned to the second intended curriculum structure of learning projects in

learning areas. These broad tasks as learning areas were the basis for sequencing content in the curriculum.

My observation of workshops and interviews with expert practitioners (electricians and plumbers) show that sequencing all the intended curriculum content according to work tasks was difficult. First, it was hard to communicate the depth of knowledge and skills required for what seemed like minor work tasks, especially when the tasks were isolated and dislocated from practice. As explained in Chapter 3 Section 3.3.1 (p. 42), practice is based on the ability to make connections (i.e. inferential comprehension) within systematically organised knowledge related to the know-how required for work based on occupational expertise. Second, the main discussion in the workshops focussed on task performance and on figuring out how to do the task, which seemed to reduce the full scope of the specialised knowledge required for occupational capacity. This shows how focussing on something "practical" can provide "some" of the knowledge and practical skills that are needed, but not the fullness of training, for practice. Third, the focus on performance did not clarify all the underpinning knowledge and skills that were needed, and thus, the focus on tasks compromised the types of knowledge required to develop occupational capacity for occupational practice. The problem lies in how much "correct" task performance can tell the assessor about what the student knows. What was highlighted by Electrician Expert 1 was that it was essential to assess all the steps taken, or the method used, by the student to, for example, install a light bulb, rather than to make the installation of a working light the only testing criterion.

Finally, on a theoretical note, it is important here to consider the three sets of evidence presented in this chapter, in light of how occupational practice was conceptualised in terms of several types of knowledge in Chapter 3 Section 3.3.3. (p. 46). In the discussion on occupational practice, I used the work of Hordern (2016), based on Young & Muller (2014), to discuss the problems in identifying the types of knowledge that are enacted, from observing work practice. The evidence in this chapter shows similarities between the problems experienced in observing occupational practice and subsequently making connections to types of knowledge, and those experienced in deriving curriculum contents from the performance of works tasks. As in Chapter 3 Section 3.3 (p. 41), the problems are to be found in how observation of task performance does not easily translate into how specialised knowledge (know-how, know-that and inferential comprehension abilities) is developed in teaching and learning processes for occupational practice. (Later, in Chapter 8, I further analyse how the three sets of evidence presented in this chapter emphasise a task-based approach to occupational practice and training that contrasts with the development of

occupational capacity.) The evidence here has shed light on the problems with identifying knowledge types from observing practice. In a similar vein, this chapter has also demonstrated the problem with moving from tasks to knowledge and practical skills in both the development and the sequencing of curriculum content: it ultimately reduces the types of knowledge associated with occupational practice and breaks down systematically organised knowledge for teaching and learning.

6.5 Concluding Discussion

The chapter has shown how the focus of occupational standards/tasks on task performance is designed down into the intended curricula for occupational qualifications. I have argued that the templates used to structure and derive the contents of the intended curricula could lead to training programmes based on occupational tasks, which are not a full representation of occupational practice. The evidence in this chapter has shown that the focus on task performance restricts and reduces the types of knowledge in curriculum content and that sequencing curriculum contents by work tasks breaks down systematically organised knowledge. The implication of the evidence is that the specialised knowledge necessary for occupational capacity is undermined through the use of standardised templates. The next chapter presents evidence that engages with how the focus on task performance in training ignores social factors, bearing in mind that the development of occupational capacity is dependent on both specialised knowledge and the social organisation of occupations.

CHAPTER 7 SOCIAL FACTORS THAT SHAPE OCCUPATIONS

7.1 Overview

This chapter presents two sets of evidence on factors in the social organisation of occupations that shape the plumber and electrician occupational qualifications and their intended curricula. Following this overview, the chapter is divided into two sections. The first, Section 7.2, presents evidence on how the role of various actors is defined by the state, particularly through the use of a task-based approach in its standardised templates, which has consequences for the development of occupational capacity. The defining role of the state can be identified in the diminished notion of know-how in occupational qualifications, the rigid and generic structure of the qualifications, and decontextualised foreign assistance. The second section, Section 7.3, presents evidence that reveals problems within the social organisation of occupations that are not recognised due to the focus on task performance in the intended curricula. The problems identified in the electrician and plumber occupations include the lack of employer willingness to train, reduced opportunities for know-how development in the workplace, and deskilling in the workplace that ignores broader occupational goals, undermining the development of occupational capacity.

In Chapter 3, I showed that both specialised knowledge and the social organisation of occupations underpin occupational capacity. Occupational capacity is a requirement of expert practice, and vocational learning programmes are intended to develop this occupational capacity. Chapter 6 provided insights into how a task-based approach to occupational qualifications and their intended curricula[10] reduces the types of knowledge and breaks down systematically organised knowledge in the curriculum contents. This chapter engages with aspects of training, the labour market, and work conditions to show how a states' task-based approach in templates for occupational qualifications may disempower professional bodies, particularly the broad range of experts in a field who establish, maintain, and advance the profession. I argue that the state's intervention, through task-based occupational qualifications, in the vocational education and training system fails to recognise the problems facing the training, employment opportunities, and practice of electricians and plumbers.

[10] Curriculum framework (first intended curriculum); and national occupational curriculum content or NOCC (second intended curriculum).

The broad argument of this thesis is that a task-based approach to occupational qualifications and their intended curricula does not lead to sufficient training for occupational practice, or in other words, to the development of occupational capacity for expert practice. To help show how the chapter fits into this broad argument, the connections between the concepts developed under the social organisation of occupations in Chapter 3 and the evidence presented in this chapter need to be made more explicit here at the outset. Under the social organisations of occupations, I earlier foregrounded three actors who are influential in shaping occupational training and practice: professional bodies, institutions, and the state. In the evidence that I present in this chapter, these actors are represented. The views of the three electrician and two plumber experts interviewed, who participated in the development of the occupational qualifications and their intended curricula, represent the type of expertise that is found in professional bodies. The views of the policymakers and facilitators form part of the state's regulatory agenda for occupational qualifications, while the views of the human resources manager, who reviewed all the evidence presented in this chapter, provide some insight into the employer's perspective.

Further, the chapter draws on the concepts foregrounded in Chapter 3 to explain the evidence in three ways. First, professional bodies are the guardians of specialised knowledge in relation to defining the scope of practice. Second, the nature of institutions is to shape occupations according to their agendas. Third, amid social and economic pressures, the state can either mediate the agendas of the different actors or prioritise the agenda of a particular group. These conceptual propositions provide the background to interpreting the evidence in this chapter.

7.2 Social Organisation of Occupations: Roles Various Actors Play in the Development of Occupational Qualifications and Intended Curricula

This section shows how the structure of the development processes defines the role of various actors in the social organisation of occupations. In the earlier conceptual discussion foregrounding the evidence in this chapter, I explained how autonomous practice is based on specialised knowledge but requires professional bodies to jockey in social, economic, and political processes to establish the right to practice certain types of work. A similar logic to the previous chapter flows through this section and chapter, which is that the task-based design of occupational qualifications and their intended curricula undermines specialised knowledge. But, in addition, as I show in this chapter, the development processes empower certain actors, which, in turn, favours the agenda of a dominant group that undermines the development of occupational capacity in training. Building

on the evidence in the previous chapter, the evidence presented here shows how the state's regulations favour its delegated actors, who support its agenda of "training to employer needs" at the expense of developing occupational capacity. Briefly, the agenda for "training to employer needs" is distorted in two ways. First, as mentioned earlier in Chapter 5 (Section 5.3.2 p. 85), the lack of employer participation evidenced in the development process leads to questions about whose "needs" are the basis of the intended curriculum contents. Second, the state's agenda can affect the social organisation of occupations by oversimplifying know-how into task performance, which creates a distorted view of occupational training and practice as seen in the three groups of evidence presented in this section. The evidence shows how the state's actions in occupational qualifications weaken systematically organized knowledge and thus know-how; create a rigid, generic qualifications structure; and enable decontextualised foreign assistance.

7.2.1 Weak Understanding of the Role of Systematically Organised Knowledge in Know-How

This section builds on Chapter 6 (Sections 6.3 p. 94 and 6.4 p. 104), which showed how standardised templates prioritise task performance in the contents of the intended curricula and how drawing out different types of knowledge and sequencing curriculum content from task performance poses a challenge in the development of the intended curricula. Here, the evidence will show how policymakers and facilitators interpret problems with curriculum delivery based on their perceptions of "relevant" training for ensuring work readiness that meets employer requirements. The evidence shows that policymakers and facilitators equate the performance of tasks with a version of work readiness that contains both the student's knowledge, and the ability of the student to apply their knowledge. In contrast to the performance of tasks - the understanding of know-how developed in Chapter 3 explains know-how that is exercised in occupational practice is part of and based on know-that (systematically organised knowledge) and inferential comprehension abilities. Thus, I argue that the evidence presented in this section, together with the evidence presented in the last chapter, shows a weak understanding of the role of systematically organised knowledge in the know-how exercised in practice. In doing so, I aim to show that the development of specialised knowledge for occupational capacity can be supported, or hindered, by actors in the social organisation of occupations.

Based on the interviews with policymakers, there were certain problems with the vocational education learning programmes that preceded occupational qualifications. As Policymaker 2 explained:

> Now you cannot learn like this. You cannot go learn the theory and do an exam. We do it like that in South Africa, and that is why our people in South Africa are so useless. Our electricians today are very poor because they go and learn a lot of stuff in the college, and they write an N1, N2 or N3, they go into a college workshop, they do CBMT modules—practical modules—and they finish them, and then they go to the workplace. Now when the guy wants to apply that first module, and he has got to remember some theory, and he has to remember a little bit of practice—he did that 18 months ago, and he did this 12 months ago. He can't remember a damn thing, and he has got to do it all over again. You do not learn like this. Nobody learns like this.

Policymaker 2's explanation identifies two problems. First, in previous vocational learning programmes, there was a long gap between students completing college and training in the workplace. This long gap was viewed as problematic because students would struggle to recall what they had learned in college when later training in the workplace. Second, there was lack of application of their learning by students because either the curriculum content was too theoretical and had left them with little time to apply their knowledge or they did not have enough opportunities (for example, during work experience) to apply their knowledge.

Policymaker 2 also raised questions about how much theory a student actually required to perform work tasks while critiquing the overemphasis on teaching and assessing theory in vocational learning programmes at public colleges. The evidence in this section shows how the problem of "lack of application of theory" has shaped a diminished notion of know-how in the occupational qualification and intended curricula development processes. This diminished notion of know-how contains a particular understanding of how theory (knowledge) and performance of work tasks (practice) relate to each other.

It is important to review how policymakers and facilitators understand the problems in vocational education, in view of the state's agenda for "training to employer needs" as reflected in the focus on task performance in intended curricula templates. For Policymaker 1, the problem with curriculum delivery could be found in colleges focusing mainly on teaching theory with no practical application. In their words: "we come from a situation in TVET colleges where lecturers rely solely on one textbook, and we are not going down that route again". Policymaker 1 made this comment in the context of the difficulty that public college lecturers were experiencing in implementing the first intended curriculum (curriculum framework) with knowledge, practical skills, and work

experience modules for occupational qualifications (discussed in Chapter 5, Section 5.2.2 p. 78). Policymaker 1 highlighted how the previous system had relied on a "textbook", which in the context of the interview meant a reliance on teaching theory over practice. As the earlier quote from Policymaker 2 shows, they too had a similar explanation for why the delivery of curriculum content at colleges had not been working: "Now you cannot learn like this. You cannot go learn the theory and do an exam. We do it like that in South Africa, which is why our people in South Africa are so useless". Policymaker 2 was responding to a question as to why the training system for trades was not working. The implication is that in their views, the focus on teaching and assessing theory had not prepared, and does not prepare, students adequately for the workplace.

Policymakers 1 and 2, in general, presented a broad view of the problems in the VET system. Alongside the evidence from policymakers, the evidence gathered from facilitators also showed that their understanding of the broad problems in the VET system drove their implementation of the development processes for the intended curricula. What policymakers and facilitators alike raised in discussions on what occupational qualifications are intended to solve, was the idea of a "well-trained" apprentice/electrician/plumber. The use of "well-trained" indicated a person who was trained to apply what they had learned to perform work tasks. Facilitator 2 best explained this view, which was also held by Policymakers 1 and 2, and Facilitator 1:

> But then, other than that, prior criticism that people, you know, the apprentices actually don't really know what they're doing. They can just regurgitate information, but they can't really apply what they've learned. That's not going to change because … [people] learn in a disconnected manner, we, you know, you first learn theory, and then only months later, you'll actually apply whatever theory you've learned, and then people won't be able to connect the pieces.

The idea of students only being able to "regurgitate information", and not being able to "apply what they've learned", leads to a core characteristic of the development processes, which is that all curriculum content (knowledge, practical skills, and work experience) is directly linked to task performance. Facilitator 2 better explained this, in the context of the focus of the second intended curriculum (national occupational curriculum content) (emphasis added):

> And that should reflect, typically, *what people working in that particular occupation do on a daily basis*. And there's got to be. You've got to have the theory, and the practical, and the workplace integrated and delivered in such a manner.

Earlier, the evidence in Chapter 6 (Sections 6.2, 6.3, and 6.4) showed that the intended curricula templates used by facilitators and supported by policymakers define "what people working in that particular occupation do on a daily basis" (Facilitator 1) as a collection of occupational standards/tasks grouped in an occupational profile, from which content is designed down into the intended curricula. What the emphasis on "application" in the intended curricula does is to shape the content of the knowledge, practical skills, and work experience modules according to the requirements of task performance. In so doing, the way task performance is captured in the intended curricula assumes that occupational practice can be a series of one-to-one relationships between theory and practical application, rather than a practice flowing from specialised knowledge.

In centralising "application" of theory through task performance in the intended curricula, policymakers and facilitators are making two assumptions. First, they are assuming that a curriculum can accurately capture the nuances of a work scenario in which a student's performance in that scenario provides an accurate assessment of their abilities and knowledge. The evidence presented in Chapter 6 (Section 6.4.1 p. 115) earlier showed the difficulties that expert practitioners had in capturing a work scenario in actuality. Second, there is an assumption that theory and application can be captured in a teaching and learning processes based on a formulaic organisation of knowledge, practical skills, and work experience for task performance, such as in the second intended curriculum (see Chapter 6, Section 6.4 p. 104). This stands in contrast to Winch's (2010) argument that systematically organised knowledge—containing different types of knowledge (disciplinary knowledge, knowledge by acquaintance, and practical knowledge), including know-how and inferential comprehension abilities—is what is required for the development of specialised knowledge for practice. My observations of workshops, as detailed in Chapter 6 (Section 6.4.1), showed how difficult it was to structure knowledge requirements in line with task performance, through its portrayal of practice as a series of work tasks performed where individual tasks were underpinned by specific knowledge requirements. The difficulty lies in how performing certain tasks required "more" knowledge upfront than provided for by the intended curricula structure. Additionally, as the evidence in Chapter 6 (Section 6.3 p. 94) showed, the complexity of the knowledge about water pressure needed in plumbing practice required development over a long period rather than be related to a single outcome-based criterion. The state's requirement of defining an area of practice, such as water pressure, as a single outcome is based on the idea that there can be a one-to-one relationship between theory and application in vocational learning programmes. Thus, taken together, the two assumptions made by policymakers and facilitators—

which contrast with the evidence from Chapter 6, as recapped in this paragraph—show how the state has a weak understanding of the role of systematically organised knowledge, and consequently, how inferential comprehension abilities underpin know-how.

This section has shown that embedded within occupational qualifications are the policymakers and facilitators' perceptions of the problems with previous vocational learning programmes, which inform the state's agenda found in standardised templates and development process for qualifications and intended curricula. The state associates problems with students' inability to "apply theory" with work readiness. Following on from this, the state's agenda prioritises task performance for "training to employer needs", where task performance is a form of application of theory to solve issues with work readiness. By equating work readiness with task performance, the state and those to whom it delegates functions have chosen to drive the contents of learning programmes, through the work of facilitators and the use of standardised templates in the development of the intended curricula for occupational qualifications, towards only what is necessary for work task performance. The narrowing of curricula content in line with the requirements for task performance, in turn, reduces knowledge types and breaks down systematically organised knowledge and thus weakens the development of know-how through curriculum content.

7.2.2 Generic and Rigid State-Mandated Structure of Occupational Qualifications and Intended Curricula

A key characteristic of the development processes of occupational qualifications and their intended curricula—based on the policy documents, intended curricula documents, workshop observations, and interviews—is the centrality of the structure of the standardised templates in discussions on curriculum content. The evidence shows how the regulatory templates lead to a generic qualification structure that does not support the workplace training available at employers. As noted throughout the thesis for trades, both plumbers and electricians require workplace training (often in the form of an apprenticeship) to qualify for the trade test that leads to certification to practice.

The origins of the generic qualification structure can be associated with the institutional goal of the regulatory body, i.e. the Quality Council of Trades and Occupations, to simplify the National Qualifications Framework. There was an unnecessary proliferation of qualifications and unit standards under the initial implementation of the NQF (Allais, 2007, 2011), and a part of the

regulatory body's mandate, as explained by Policymaker 1, was to simplify the NQF by reducing the number of qualifications available. Policymaker 1 further explained that the number of qualifications under the NQF had become burdensome for regulatory and accreditation bodies. Based on the interviews with the expert practitioners, the generic qualification structure meant that specialisations could not be easily accommodated, with development processes focused on an occupational qualification and intended curricula that trained a "general electrician" or "general plumber". The problems with a rigid generic qualification and intended curricula structure arose in interviews with the electrician experts, who found that the structure was difficult to navigate given that the workplace training that was available was driven by specialisations. The two plumber experts interviewed, however, did not experience the same problems as the electrician experts.

The gathered evidence suggests that while a "general plumber" qualification was possible, a "general electrician" qualification would be difficult to implement. As Plumber Expert 1 explained, and with which Plumber Expert 2, agreed, there was enough standard work for a general plumber, and if specialisation was required, the training needed to occur at the company. In their words:

> So, I'm very much against the idea that there should be a myriad of specialisations. There's enough common or common work that he [the apprentice] needs to be good at, and that would form a sound basis to go into work.

What the plumber experts highlighted is that there are enough workplaces to support "general plumber" practice and training. In contrast, Electrician Expert 3 reflected that a "general electrician" qualification is problematic when considering the limited availability of workplace training for a "general electrician". As Electrician Expert 3 explained:

> But I think what's gone wrong with the current thing is we tried to make it one thing [one electrician qualification]. And that's what's happening at the workplace approval [stage] now. And workplace approval is actually becoming the biggest obstacle to getting skills development happening. Because what happens is, I go to your plant, and you want to train [an] electrician now. And I say, okay, well, this is the curriculum, you need to be able to cover this curriculum with your apprentice … on your side. Now, if you're a contracting business, it's unlikely you're going to touch on motors and starters— and a couple of other things that would be in a plant environment. So, therefore, you need to be able to send your apprentice to someone else to give him that skill before you [the apprentice] can become a qualified artisan. And companies are saying, I'm paying workman's comp on that person, I am paying his salary, but he's now working for somebody else because the criteria

> are that he got to go there. But all the[se] years, I've trained apprentices that passed the trade test and are good artisans, but I can't train him today because I can't meet all the criteria.

Electrician Expert 1 reflected on the frustration in the community of expert practitioners in the workshops—expressed by all three electrician experts interviewed—with the curriculum contents not being in line with the kind of workplace training available. According to Electrician Expert 1, this is how it played out in the workshop:

> Then we got to the difficult part—the workplace. But we had the mines sitting there, we had the municipalities, we had the [representatives from] Eskom and the construction [industry], and everybody [was] sitting there. So, we start going through, so we say "okay, fine", and this is … why we are going to [do this]. So, if you go look at the qualification, you'll see these contextualised contexts.

Electrician Expert 1 provided examples of "contextualised contexts" and noted how this related to training in the workplace.

> Yeah. So, to be able to install wire ways in the construction industry, this is what I need to do. But if I'm working for the municipality, I need to do it this way. If I am working for that one, I need to do it that way. Now, when you look at that, all of a sudden, the dynamics change because I'm doing one qualification.

They further noted the different methods used for installing "wire ways" in different industries, explaining thus:

> So, if I was trained in the metal industries, my workplace modules needed to be like this. Now, where does it change? And wire ways are easy because wire ways remain the same. But when I start going to the cables, the municipalities tell you, but we don't work on 60 mm2 cables. We are working on 1111, kilovolts and 22 mV and all of that other stuff. So, they train the guys to install an 11-kV cable and a 22-kV cable.
>
> The skills are completely different to installing the cable that feeds the power in your house current.
>
> Yeah. And they're completely different skills.
>
> But yet, the exposure that I'm providing my apprentices is to be able to meet them to install the cable that fits in your house.

What Electrician Expert 1 is explaining here is that at times, the task of "installing cables" may seem to provide a basis for generalisation of training, as all electricians need to install cables. However, the practical skills module content varies in relation to how installation occurs in different industries. This explanation is important in terms of what needs to occur during the training of an apprentice. As Electrician Expert 1 explained, exposure to installing a cable that fits in a residential house cannot be readily applied to installing a cable in the metal industry, both of which would be part of the practical skills development. While the problem seems superficially to only exist in the work experience modules when the student enters workplace training, the specialisations for electricians in metal, mining, municipalities, or Eskom (the national electrical power provider) require specific knowledge and practical skills that do not easily fit a "general electrician" qualification, or more specifically, a generic, rigid qualification structure. Electrician Expert 1 reflected on this situation:

> Something's wrong. Something is wrong, but we accepted that. Why? Because that was where we had the fight. The fight eventually came down to the workplace and how does the workplace fit in.

This "fight" was recounted by all three electrician experts. The conflict centred on how to include all the different aspects of knowledge and practical skills required for specialisations under one generic qualification. Based on the interviews, there was seemingly no resolution to this conflict, and what occurred was that the experts decided "not to fight about" it and to give the regulatory body "what they wanted" (as discussed in Chapter 6). The point that I am highlighting here is that the inflexibility of the "one-size-fits-all" approach in a rigid, generic qualification may have led to an electrician occupational qualification and intended curricula that does not represent how the training that is required in a college and the workplace needs to be linked to specialisations.

The evidence in this section has showed that while a generic qualification structure could work for plumber training due to workplace training availability, a different approach may be needed for the electrician occupational qualification. This suggests that a one-size-fits-all approach, reminiscent of CBT approaches in state-led vocational education policy, may not work for all trade-based occupations, especially when considering work conditions for training requirements. In terms of the concepts under the social organisation of occupations (Chapter 3), the state's agenda, in the form of a rigid, generic qualification structure, overrides the concerns of the electrician experts (who represent a type of professional body expert) regarding the contextual unsuitability of the qualification structure in relation to the availability of workplace training.

7.2.3 Lack of Contextualisation of Foreign Assistance

As discussed in Chapter 3, professional bodies represent a community that defines the scope of work based on a specialised body of knowledge; and the strength of this community lies in shared work behaviours, procedures, and practice, based on agreed upon jurisdictional boundaries to create and maintain specialised knowledge. In the medieval period, it was easier to envisage how a community could share practice in a local area. In contrast, today, as Abbott (1989) highlights, there are difficulties in identifying the members of a professional body, given how knowledge and practice in a specific area can draw from both local and international contexts. One of the stated goals of the QCTO is to internationally benchmark qualifications (National Qualifications Act, 2008 [Act No. 67 of 2008]: Occupational Qualifications Sub-Framework [OQSF] Policy, 2014), which means measuring and evaluating training according to international best practice in an occupation. This section does not cover the specific details required for international benchmarking; rather, it presents evidence highlighting how the state, in implementing international best practice, has not fully considered the local context. The evidence shows how the role of foreign assistance in regulatory processes and intended curricula has lacked understanding of the contextual nuances of training and practice in South Africa.

The role of foreign assistance and its associated consultants was a recurring theme in the interviews with policymakers, facilitators, and expert practitioners. There were two types of foreign assistance identified in the data: first, the role of foreign consultants in the development of the second intended curriculum (national occupational content curriculum) for electrician; and second, the role of an international organisation in shaping processes at the QCTO. Additionally, it is worth noting here that the second intended curriculum was developed by an international NPO (i.e. an international organisation).

In the process of developing the second intended curriculum for electrician, a part of the workshop included a foreign consultant, who seemed to play the roles of both expert practitioner and facilitator. Electrician Expert 1 expressed frustration with the heavy foreign influence in a case where local experts were involved in developing the intended curriculum:

> You cannot bring a German model or an international model into a third or fourth world country. You must get buy in from grassroots. Do you understand? How are we going to

> drive this? I've lived in South Africa ... and everything in the last 30 years, you get to understand what is happening at the ground level to bring in such a model.

What Electrician Expert 1 was highlighting was the lack of foreign consultants' understanding of the context of training. Similar views were expressed by Electrician Experts 2 and 3.

Electrician Expert 3 identified the problem with the heavy foreign influence when recalling how the group of experts challenged the presenter in one workshop:

> The other problem is, and you will get it from … [names of other experts in the group] ... we really always had in the NOCC [second intended curriculum] program when we started it ... [names of the other experts in the group] said to the presenter, this is not Germany or Taiwan, our people here are completely different, they learn differently, you can't just apply German principles—our schooling system is different to Germany. [So] the learners coming in to us haven't got the same foundational knowledge that we expect the learner they get in Germany. So those are the things we really try and bring a lot of these [NPO] people's views into our skills development and some of them are just far off, you know our entry points are different today.

What Electrician Expert 3 was highlighting is that the expectations of the levels of education of students entering an electrician training program are different in Germany and in South Africa.

Electrician Expert 2 explained these differences in more detail, when reflecting on the role of foreign actors:

> Unfortunately, there was a lot of German influence in that process. And the guys that were trying to design it, so when we designed it, we were pushed in a direction by the Germans. That is not always up to standard for us.

Explained the meaning of a "German direction", the expert noted, "They wanted to train our people like they would train a German student in Germany". Electrician Expert 2 further highlighted the difference in training in the German and South African contexts; and explained the problem with curriculum content that is not contextualised to South Africa, where education requirements vary substantially:

> …in Germany, they require higher qualifications to become an electrician, … [while]… you can become an electrician with an N2 certificate here. Which is not really a high qualification. It's, it's very low actually, …and you can start an electrical qualification with a grade nine certificate. So you need to come down to the level, and it's not happening with them [foreign consultants]. They were trying to give scenarios [based in a foreign

> context] and we said that you got to teach the guy the job first and then let him be able to do [perform] a scenario. So, you can't give him a scenario and say go and do the job. It's not gonna work like that in this country.

Understanding Electrician Expert 2 above reference to a job and scenario is further explained in the below quote. Electrician Expert 2 provided an example or scenario that the foreign consultants used, but which did not apply in the South African context. The scenario was of a job that involved installing a gate motor. As Electrician Expert 2 recounted:

> You [the student] need to go to the house and make a quotation or do a quotation to put in a gate motor or putting a security light or something like that. Then you have to do the material list that you're going to need and do the quotation for labour and that kind of thing. And the guys have not yet learned how to do the job. So, they need to learn how to do the job first before you can give them scenarios like that to go and do that.

This example from Electrician Expert 2, together with the reflections of Electrician Experts 1 and 3, show how understanding the education levels of students and the problems facing training in the local context requires consideration in the curriculum contents of the learning programme. It is worth noting that the plumber experts did not identify the same problem, and in general, the plumber experts expressed less frustration and fewer conflicts in all the processes.

The problem experienced by the electrician experts in the development of the second intended curriculum with foreign consultants may seem isolated. However, two pieces of evidence support the notion of widespread foreign intervention in the QCTO with regard to occupational qualifications and their intended curricula. First, the documents analysed to understand the processes to apply for and develop occupational qualifications and their first intended curricula (curriculum frameworks), were "developed with the assistance of the GIZ[11] on behalf of the German Government" (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2013, p. 2, 2014, p. 2). Therefore, foreign consultants influenced the application and development processes, and the structure of standardised templates for the occupational qualification and first intended curriculum. Second, foreign assistance is still ongoing at the QCTO. Discussing the kind of model the QCTO would be, Policymaker 1 noted:

[11] GIZ is a German development agency that provides services in international development and education.

> The model that we want to move to is the model that is used in BIBB[12] [in] Germany. We have interacted with them quite a bit, and we have even had a presentation by BIBB …
>
> … On the other side, if we want to follow the BIBB model—which is what we want to do, and that is why we are establishing our research unit. It is about identifying who are the industry players that we need to go to ascertain whether this qualification is needed and, if yes, what needs to go into it. And in BIBB, that takes a minimum of six months—in fact, more. So, ours [our model] is just getting somebody in there for a week and two weeks. And so, we are developing things that we might not necessarily need, so that is a transfer [to the BIBB model] that we want to make.

Therefore, based on foreign assistance in the current and future processes of the QCTO, as just described, the issues experienced by the electrician experts seem unlikely to be isolated. The nature of foreign assistance in the development processes of intended curricula and at various levels of the QCTO's structures, as described in this section, suggests a lack of contextually driven solutions as an overall theme in the processes that emerged in the data. Reflecting back on the concepts developed in Chapter 3, the role of the foreign assistance, enabled by the state, can be identified in terms of the social organisation of occupations. In occupational qualifications, the state, represented by the QCTO and the Department of Higher Education and Training, delegates functions to foreign actors, where there seems to be a lack of contextualisation of international policy or advice on curriculum content to the local context. This lack of contextualisation was highlighted in particular by the tension between the foreign consultants and the electrician experts (representatives of the professional body) over curriculum content in workshops.

This chapter has, thus far, shown how the state, through its regulatory processes, shapes vocational training through occupational qualifications and their intended curricula in three ways. First, it does so by foregrounding task performance in the "application of theory", which leads to minimising the know-how enacted in practice to perform tasks. Second, occupations are defined in a "one-size-fits-all" approach to training for trades through a rigid, generic qualification structure. Third, the state shapes vocational training through enabling foreign assistance that do not sufficiently contextualise the education levels of students in South Africa. The next section pivots to engage with the evidence on problems in the broader social organisation of occupations

[12] BIBB is a federal institute for vocational education and training which center for vocational research and ongoing development of vocational education and training in Germany.

that are either invisible or cannot be addressed when, as I argue, the policy focus of vocational learning programmes is on tasks.

7.3 Social Factors Influencing Curriculum Content and Workplace Training for Electricians and Plumbers

As mentioned in the previous section, workplace training—often in the form of an apprenticeship—is a requirement for the trade test for certification to practice as a plumber and electrician. The work experience modules in the intended curricula provide the logbook for workplace training. This section focuses on how contextual social factors and actors influence occupational practice, and thus, curriculum content and workplace training. The evidence thus far has shown how the state, through templates, processes, and delegated actors, has shaped occupational qualifications and their intended curricula to focus on a distorted version of work readiness captured in task performance (discussed further in Chapter 8 Section 8.4 p. 156). What the evidence, drawn from the underlying logic of templates (Chapter 6, Section 6.2 p. 91) and examples from the intended curricula for plumber and electrician (Chapter 6 Section 6.3 p. 94 and 6.4 p. 104),has shown is that the state has assumed that the main problem in vocational education programmes is insufficient "application" of theory (Section 7.2.1 p.124), which can be solved by an emphasis on task performance. I argue that by emphasising task performance in addressing its concerns about work readiness, the state has limited its perspective on the potential problems affecting the training and practice of electricians and plumbers. This section focuses on problems within the social organisation of occupations that affect curriculum content and workplace training, from the perspective of the plumber and electrician experts interviewed, with some insights from the HR Manager to also provide an employer's perspective.

7.3.1 Lack of Employer Willingness to Train

For the three electrician experts and two plumber experts whom I interviewed, the problem with current learnership programmes is that participation in theoretical and practical skills training at colleges is not tightly coordinated with workplace training. Electrician Expert 2 explained why it is challenging to secure employer involvement for workplace training after the enrolment of students, as is the case in the current public system:

> And the other thing I think that's quite serious, I think, is in the case of the TVET colleges, where they are taking the students and training them, and then trying to find an employer

> to place them. That is probably one of the major pitfalls. I sat in on a national skills funds briefing on Friday. Yeah, and they've got a project with, I want to say, four and a half thousand apprentices. But the problem with that is getting workplaces for those guys. There are a lot of companies that don't want to do it because of the safety aspects and things like that. So, we are embarking on a project now to try and find employers to train these guys. But what if they do not involve the employer from the beginning when they enrol the guys [apprentices]? The employer is not going to take responsibility and assist [with workplace training], so they need to be involved from the beginning.

Electrician Expert 2 commented on the need to find employers to train students from the beginning when the student is enrolled. This is not a new need. As noted in Chapter 1, Section 1.4 (p. 11), one of the problems with NATED programmes was the link made between the high unemployment levels of graduates and students' struggles to get work experience, where there was a lack of incentives for employers to provide work experience. In the previous chapter (Section 6.4.2 p. 119) and earlier in this chapter (Section 7.2.1 p. 124), the evidence I have presented shows how policymakers and facilitators seemed to believe that the problems with trades training at colleges demotivated employers to take on apprentices. The lack of employer motivation was linked to training at colleges, which produced, as Facilitator 1 described it, "apprentices [who] actually don't really know what they're doing, and they can just regurgitate information, but they can't really apply what they've learned." Also, to recall, Facilitator 2 and Policymaker 2 explained—see Section 6.4.2—how their task-based approach to the second intended curriculum (national occupational curriculum content) had some form of industry support, which was explained by Facilitator 1 thus: "You actually structure the training program where you drive everything by work/occupational tasks. Like, industry totally gets it … [and] they get on board with it". What the data from the interviews with the policymakers and facilitators suggest is that industry/employers do not want apprentices who cannot apply their knowledge, or more specifically, who cannot perform occupational tasks. However, there may be several reasons for students not being able to secure work experience. Below, I outline two reasons that could reduce the availability of placements for workplace training.

First, there might be a lack of employer willingness to train, due to the limited capacity of master craftsmen/senior artisans trained to the legacy qualifications to understand the different language of outcomes used in the logbooks for workplace training. As Electrician Expert 3 explained,

learners are trained to the outcomes-based NQF qualifications and use terminology that is different from that used by master craftsmen/senior artisans trained to the legacy qualifications:

> And what happened is we sent the learner to learn in NQF, outcomes, outcomes and all of this fancy terminology, and we sent him to an artisan that came through legacy qualifications that had modules in their courses, and then he [the artisan] learned all of those things. And it was nearly as good as you were sending a person that spoke Russian [learner] to a person that spoke French [artisan]—they couldn't communicate with each other.

Electrician Expert 3 reflected further on the disconnect between the learner and the artisan responsible for the training. The artisan/master craftsman who does not understand outcomes can struggle with understanding what kind of training the apprentice/student has and what the apprentice/student is capable of. Thus, the artisan can be uncertain about where to start and about what is expected of workplace training. Electrician Expert 3 explained the uncertainty experienced by the master craftsman/senior artisan in training an apprentice to the previous outcomes-based qualifications thus:

> So, what happened is that we see how APIs [apprentices/students] are to artisans or these learners are to artisans that didn't really understand learnerships and outcomes and stuff. I used to run a program with all my artisans before sending him [the artisan] an API. To send you as an API, you did a first year of teaching a learner on a learnership. He's [the artisan] learned these things when you [the artisan] call that a module; we now call it a unit standard. When we now call it an outcome, you [the artisan] call it a test. So, I brought the things back. And after I've trained the artisans on what this new API is coming with. He [the artisan] then grasped an understanding of what this apprentice is capable of doing. So, …you must remember, even when that artisan became an apprentice himself and went to an artisan, he said, I'm a first-year API, the artisan understood what a first-year API was capable of doing. So, I could make the first-year API practice - go and pull in a cable. I could make him go and do certain things because I understood the level of training.

As Electrician Expert 3 thus explained, senior artisans had to participate in some retraining to adjust to the outcomes-based qualifications. The lack of willingness to train may be linked, in part, to ongoing regulatory changes with "fancy terminology", with which artisans/employers may be reluctant to engage, as highlighted by Electrician Expert 3:

> …when we changed these modules [for legacy qualifications], we didn't obtain the artisans' understanding of what this module was. And we've done exactly the same thing with the

> occupational qualification. So, yeah, we haven't tied these two things back to the people that are on the worksite.

What Electrician Expert 3 is highlighting here is the senior artisans/master craftsmen's struggle with the ongoing changes in the last two years, which have included changes in language and the introduction of terminology that is unfamiliar to trainers.

Second, there may be a lack of employer willingness to train because the employers may not need the employees for their business. The five experts I interviewed disputed the widely perceived notion of a shortage of plumbers and electricians as indicated, for example, in *The 2020 List of Occupations in High Demand* (Capazario & Fouché, 2020). The two plumber experts highlighted that there were pockets of shortages in some specialisations in plumbing. The notion of a shortage of electricians came up far more in the interviews. The problem of the perceived shortage of electrician skills, though, is nuanced, as seen in the description by Electrician Expert 2:

> I really don't think that the electricians are in shortage…As I say, the guys expect the guys to have the experience when they qualify, and they are not giving them jobs because they have a lack of experience. The other thing is we have a lot of companies that are retrenching at the moment. And we are losing a lot of labour to this. And it's one of these, even guys with experience on the streets are not getting jobs. So, these are some of the factors that are playing a large role in the employment of electricians. But we have noticed over the years here that our numbers in training for electricians have declined considerably. Because some of the methods of the mining industry, that's part of it, but we don't only train for the mining industry, we train for all industries. Yeah. And we have noticed that electricians are in a downturn in the numbers.

What Electrician Expert 2 is highlighting here is that perceptions of skills shortages may be linked to unrealistic expectations of employer demand for recently qualified electricians. Electrician Expert 2 acknowledged the decline in numbers in electrician training programmes, but also recognised that other factors are playing a role in the employment of electricians such as changing methods in the mining industry. Therefore, the availability of qualified electricians and plumbers for the workplace may support the idea that employers do not need to engage in the training of students.

These two factors—ongoing regulatory changes that create uncertainty in interpreting the logbook, and the availability of qualified electricians and plumbers—may be contributing to a lack of employer willingness to train.

7.3.2 Reduced Time for the Required Training of Apprentices/Students

In the interviews with the experts, I asked them several questions about their own training and about how training occurs today. These questions were aimed at uncovering how training has changed over time, and whether any specific changes have influenced training today. Two factors were raised—increased production demands, and stricter health and safety standards—that seemed to have reduced the time available for training apprentices and students.

The first factor that has changed training is the rise in production demands, compared to previous decades, and this has reduced the time available to train students. Electrician Expert 3 reflected on how training has changed since the 1970s:

> And let me give you an example of the breweries now. The breweries [were] pulling on when I left—we were filling 42,000 beers and outlets. So that the long run, fills up 42,000 beers an hour. In the past years, if the thing broke, you could stop filling up and take out the motor and check it out. If the thing stood for two hours, there wasn't a problem. Today when that thing stands for half an hour, they've lost 21,000 beers. Okay, so it turns to money. So, in the industry today, we've automated a lot. So, if something breaks, they have to identify the problem is that motor, that component and take it out, put a new one in and the thing gets going. In many industries today, artisans don't have time to even train. Because if I have an apprentice now that I need to train, and even when I've run my main training programs for coaching and mentoring - if you want to train an apprentice, you need time to do that, yeah, if you can manage to do a job, you need to allocate another half an hour for an apprentice to come and learn that skill. But now the artisan is being pressurised to make the plant work again; he hasn't really got time like we did in the old days to actually train an apprentice, because productivity is now the key thing that is busy driving.

What this quote from Electrician Expert 3 acknowledges is that the rise in production demands has placed some pressure on senior artisans/master craftsmen's time. When production and training pressures ultimately clash, what seems to be compromised is the time allocated to training the student. This scenario is problematic, as students need training on machines/specialised

equipment to advance and expertise. If the opportunities to train are compromised in response to rising production demands amid automation, this hinders the necessary workplace training of students.

The second factor that has changed training has been the development of autonomy in workplace training over time. Electrician Expert 2 explained the difference in responsibility—which is related to autonomy—from the past:

> Yeah, I think it's much better because in the sense that we were utilised better. We were, in actual fact, when you became a senior apprentice, you were used as an artisan. So, you did the same work as an artisan, which is not happening today. You are given more responsibility. Today, the guys have not got any responsibility because of the safety standards and the people [master craftsman/senior artisans] are scared to let the guys do the jobs they are supposed to do. They are scared of injuries and guys getting hurt in occupational hazards that happen, but we would do the same—we never had the serious standards, and that have been brought in today. Look, you know, risk assessments and things like that that -the guys have to do today, we went out and did the job and got it over and done with -now it's about an hour before you can tackle the job because you got to do risk assessments and all the planning first. So, we were left … [on our] own …to do the job and only corrected if we were doing something wrong.

Occupational health and safety standards provide guidelines to prevent workplace hazards, and they have thus improved the safety of workers today. Electrician Expert 2 was not suggesting doing away with the standards. Rather, they were explaining why there might be reluctance to provide apprentices with opportunities for autonomous practice, which is necessary to develop expertise. As Electrician Expert 2 described the situation:

> there is a reluctance to give students responsibility in the workplace. Training on the shop floor does eventually have to address real work. Because they are forced in a way to do some of the tasks because they have a logbook which they need to complete.

Electrician Expert 2 was reflecting on how workplace conditions could undermine training by not providing apprentices with sufficient exposure to situations with enough responsibility that addressed "real work". Rather, the state's focus is on prescribing curriculum content for task performance towards occupational qualifications. There may be a connection between how workplaces today undermine the development of electricians and plumbers, by not providing an environment for apprentices to develop the appropriate expertise for occupational practice, and

how employers perceive the lack of skill in qualified artisans today. As discussed in the next section, employers and workplace training can also be influenced by changing technology and employer profit goals that can undermine the training of apprentices.

7.3.3 Deskilling That Breaks Down Occupational Capacity

In Chapter 4, the concept of the social organisation of occupations captured how professional communities, institutions, and state regulations shape training and practice. In this section, the evidence shows how the state regulation of occupational qualifications and their intended curricula could undermine the development of occupational capacity. To recall, there is a strong focus in the standardised templates for the intended curricula on capturing the current work tasks in an occupation to derive curriculum contents. This section focuses on the adverse effects of only covering content related to occupational/work tasks, by considering how skills such as problem-solving are developed in the parts of the curriculum that are not directly linked to current occupational/work tasks. The evidence relies on the notion of a professional body as a community that creates, maintain, and innovates the specialised knowledge that underpins occupational practice (Chapter 3, Section 3.4.1 p. 51). The evidence is based on fault-finding, as identified by the electrician experts, which contradicts how state regulated standardised templates shape intended curricula to the occupational/work tasks practiced in current workplaces. The evidence shows how the intended curricula contents are unable to address broader occupational requirements, such as problem-solving, that are needed for expert practice. In the case of electricians, one area of the curriculum content that is reducing learning is fault-finding, which covers the analysis, repair, and maintenance of an electrical system. From an employer's perspective, the HR Manager confirmed Electrician Expert 3's view that fault-finding is required less now due to technological changes, making it easier to replace than to fix a faulty part: "So, another thing that I found that in the industry today is in the past, when something broke, yeah, and the artisan could fix it. Today, when it breaks, we replace it".

The practice of replacing rather than fixing a part inevitably reduces the scope of practice of the electrician. In this section, the example of millwright is used to explain the tension between the occupational goals of electrician experts and the profit-driven motives of employers, which can have an effect on vocational training. Electrician Expert 3 explained that the ability to replace parts leads to companies employing millwrights, who combine the skills of a mechanical fitter and an electrician. Historically, millwrights were viewed as "super" specialists and were typically qualified electricians who trained for an additional one–two years as fitters to become millwrights (or vice

versa). However, today, a millwright is trained on the same level as an electrician or fitter without the full scope of training as a mechanical fitter and electrician. The HR Manager explained that this is due to the nature of the deskilling that occurs when parts can be replaced without maintenance and repairs, with replacement requiring advanced fault-finding skills developed in the full scope of training as a mechanical fitter and electrician. While employing a millwright is more cost-effective for companies today, what may not have been fully considered—from an occupational point of view—is how a reduction in fault-finding skills, because of the reduced need for fault-finding in the workplace, affects the occupational capacity for expert practice. While fault-finding may have lessened in the current workplace, electricians still require the problem-solving skills gained in learning fault-finding for other parts of the occupational practice. Problem-solving skills are inferential comprehension abilities in the systematically organised knowledge required for occupational practice (Chapter 3, Section 3.3.1 p. 42). The following paragraphs outline how fault-finding in the workplace has reduced in the occupational practice of electricians today and connect this to deskilling.

For both mechanical fitters and electricians, fault-finding is essential for the problem-solving skills required by their occupations. Electrician Expert 3 explained how the reduction in need to fault-find and repair affects (reduces) need for the specialised electrician and mechanical fitter:

> So, what would happen is, let's use the breweries again. So, the line stops and the motor has a problem and we're gonna replace the motor, I've got to get an electrician out there to disconnect the electrical because the legislation says only trained people can work on electrically live things. ... I get the electrician out there, and he disconnects the motor, he stands back, then the mechanical fitter has to come. And he has to disconnect the motor, but the new motor is on there, and align the gears and all of those things. Then the electrician comes back, and he puts the motor wires back, makes sure the wire is tight and tests the thing. And then they can start the plant again. Now we've used two people to do that job. But if I find one millwright, he can go there. He can disconnect the motor, [and] he can mount, he can fix them out, they can do everything at one time. Now, the plant can have one millwright and millwrights are normally shift-type people. Now, instead of having ten artisans at night, I have got two people who do the whole job.

Here, Electrician Expert 3 is highlighting how deskilling occurs, as the separate skill sets of the electrician and mechanical fitter are not necessary when replacing parts. The HR Manager also highlighted how the scope of practice of electricians has been reduced by the replacement of parts

today. What is lost is the training in and practice of fault-finding that supports advanced problem-solving and analytical skills in the trade.

Electrician Expert 1 suggested that the main concern is that changes in technology have led to deskilling of electricians. As Electrician Expert 3 has previously highlighted, today, "it is cheaper to replace a part than to fix it", which is in line with the employers' goal of reducing production costs. However, skills involved in fixing motors rather than replacing them provide problem solving skills for broader occupational practice. As Electrician Expert 1 noted below, fault-finding supports problem-solving skills in the occupation and is underpinned by "conceptual learning" which is in line with the broader occupational goals:

> No, one of the problems that we faced and, and this is always the negative of the industry, okay, if we, if we take the training that I did, and I'm looking at myself through the 80s, and even into the 90s, problem-solving, within conceptualised learning was always there. You needed somebody at some point in time, this thing's gonna break, and somebody's gonna fix it. As time moved on, we got to the point where today, if it breaks, it's cheaper for me to replace it.

What the evidence in this section has captured are the tensions that can exist between occupational experts concerned with occupational practice, such as those in professional bodies, and employers that shape work according to their requirements as institutions (Chapter 3, Section 3.4.2 p. 54). The state can either mediate these tensions or regulate in favour of a dominant group's interests. Based on the evidence presented in Chapter 6, Sections 6.2–6.4, earlier and in Section 7.4.1 in this chapter, the state's regulatory emphasis on occupational standards/tasks captures what practitioners do daily in their occupation, and these current work tasks are then the focus of training. The narrow focus on current work tasks suggests that there is little room available to negotiate the broader goals of the occupation in the intended curricula. There is little room to discuss how certain aspects of the curricula content, such as fault-finding, play a large part in supporting the ability of a member of a professional body to maintain, and innovate in, their field of practice, which contrasts with driving content curriculum to achieve current work task performance.

Taken together, these problems—employer unwillingness to train, workplace conditions unconducive to training, and technology-driven deskilling that does not support the broader development of occupational capacity—are social factors that cannot be identified if the focus of the intended curricula is on content driven by task performance. Additionally, there is a lack of

recognition of social factors influencing occupational training and practice when there is a narrow focus on tasks in the intended curricula content, as discussed in the following chapter (Chapter 8 Section 8.5 p. 159). The state's support for task-focused intended curricula could further exacerbate the problems currently facing vocational learning programmes for trades, where training occurs at both education institutions (colleges) and employers' workplaces. The problem is that in narrowly focusing on work readiness as task performance in curriculum content, the actors/stakeholders who influence occupational training and practice within the social organisation of occupation are not fully considered in the development of specialised knowledge. Yet both specialised knowledge and the social organisation of occupations need to be addressed for the development of occupational capacity.

As the chapter draws to a conclusion, questions may arise to clarify how the curriculum should respond to social factors and incorporate changes. For this research, a new curriculum framework and recommending curriculum policy changes are beyond the scope of the study (consider 1.3 on the research problem, which explains the research questions). However, through the data, I am trying to show that a policy myopically focused on accurately capturing curriculum topics and performance-based outcomes won't solve the problems facing training for trades. Problems such as poorly trained apprentices, for example, can result from characteristics in the workplace such as production demands that can hinder appropriate training or that prioritising employer requirements in developing curriculum can be short-sighted when considering the whole occupation practice. However, the question of how occupational capacity curriculum responds to external factors requires further research, which I discuss in the final chapter on future research.

7.4 Concluding Discussion

This chapter has shown how the state, through the use of standardised templates and processes to develop occupational qualifications and their intended curricula, is shaping vocational learning programmes into a version of "training to employer needs" based on the "practical application of theory". This state agenda leads to limitations in identifying contextually-bound conditions and problems found in the social organisation of occupations. The evidence presented in this chapter first showed that the state's actions have led to a weak notion of know-how, as represented in task performance; a rigid, generic qualification structure; and decontextualised foreign assistance, which embrace a distorted version of work readiness (discussed further in the next chapter). Additionally, by associating problems with the work readiness of previous NATED graduates with a solution focusing on task performance in intended curricula, the state is failing to recognise factors in other

areas of the social organisation of occupations that negatively affect vocational learning programmes (that are training future occupational practitioners). Social factors—such as a lack of employer willingness to train, a reduction in the time available for training due to an increase in production demands at workplaces, and technology-related deskilling that can undermine the broader goals of occupational training and practice—are problems. The next chapter draws together the evidence presented in Chapters 5, 6, and 7 for discussion and analysis centred on four claims.

CHAPTER 8. ANALYSIS AND DISCUSSION

8.1 Overview

This chapter returns to the main research question and aggregates the evidence from Chapters 5, 6, and 7 to identify four claims, based on which I argue that vocational learning programmes are constrained by the design form of occupational qualifications. The four claims are as follows. First, the design of occupational qualifications and their intended curricula leads to a reduction in the types of knowledge in curriculum content, due to the use of standardised task-based templates. Second, the sequencing of curriculum content according to work/occupational tasks breaks down systematically organised knowledge for teaching and learning. Third, the state, through legislation and standardised templates, has shaped occupational qualifications and their intended curricula according to a distorted version of "work readiness" as task performance. Fourth, there is a lack of recognition of social factors influencing occupational training and practice when there is a narrow focus on tasks in the intended curricula content. Based on these four claims, I argue that occupational qualifications and their intended curricula do not lead to a well-designed curriculum to prepare for occupational practice. The chapter closes by reflecting on how the four claims show that vocational learning programmes need to address both specialised knowledge and the social organisation of occupations to develop occupational capacity for expert practice.

A reoccurring challenge in the writing up of this thesis has been how to show the connections between specialised knowledge and the social organisation of occupations that influence the development of occupational capacity. The concepts of specialised knowledge and social organisation of occupations developed in Chapter 3, which frame the evidence presented in Chapters 5, 6, and 7, show how the state, as a powerful actor in the social organisation of occupations, has shaped occupational qualifications and their intended curricula in a way that affects the contents of specialised knowledge, specifically systematically organised knowledge, for teaching and learning. The difficulty lies in balancing the evidence when making the connections that show how an internal force, such as the kind of specialised knowledge that has been captured in the occupational qualifications and their intended curricula, is shaped by the external force of an actor, such as the state, in the social organisation of occupations. As I make the connections more explicit in this chapter, it is worth recalling the set-up of the concepts in Chapter 3, which highlighted how the connections between the internal force of specialised knowledge and the external force of the social organisation of occupations can manifest differently. I opted to first

identify and reflect on the evidence of the two forces separately—I focused on the internal force of specialised knowledge in Chapter 6 and then the external force of the social organisation of occupations in Chapter 7. The discussion in this chapter brings the evidence together, to show how the internal and external forces of occupational capacity shape each other and to show that both specialised knowledge and the social organisation of occupations need to be addressed in vocational learning programmes for the development of occupational capacity for expert practice. The chapter outlines and discusses the four claims, which answer the sub-questions posed at the outset of this thesis, in turn, before discussing how they altogether answer the main research question. To recall Chapter 1, Section 1.6 (p. 18), the main question and sub-questions are as follows:

Main Question

How does the design form of occupational qualifications enable and/or constrain vocational education learning programmes in South Africa?

Sub-Questions

1. What form of curriculum is envisaged by the prescribed template for curriculum frameworks for occupational qualifications?
2. How is the process of developing occupational qualifications and associated intended curricula influenced by various stakeholders?
3. What kind of social factors affect learning programmes (plumber and electrician) based in workplaces and education institutions in South Africa?

8.2 Claim 1: Reduction in Types of Knowledge Due to CBT Approaches in Occupational Qualifications and Their Intended Curricula Templates

Under this claim, the analysis draws on the evidence that engages with the first two sub-questions, which focus on how the state regulatory body (QCTO), through the design of prescribed templates and development processes for the intended curricula, and various stakeholders influence the form of the curriculum contents. In responding to these questions, my first claim is that CBT approaches, such as learning outcomes and 'design down', used in developing the intended curricula narrowly focus content on task performance, which reduces the types of knowledges (disciplinary knowledge, knowledge by acquaintance, and practical knowledge). The analysis, throughout this section, outlines that this claim about the reduction of knowledge is underpinned

by evidence, which reveals that knowledge is reduced to just the 'knowledge' required for task performance in the intended curricula, where know-how is reduced to task performance. This leads to a form of curriculum that Muller (2009, p. 220) has described as "contextually tacit procedural knowledge", and what Wheelahan (2015, p. 758) would characterise as the opposite of a "knowledge rich vocational curriculum". The following paragraphs summarise and analyse the evidence for the claim.

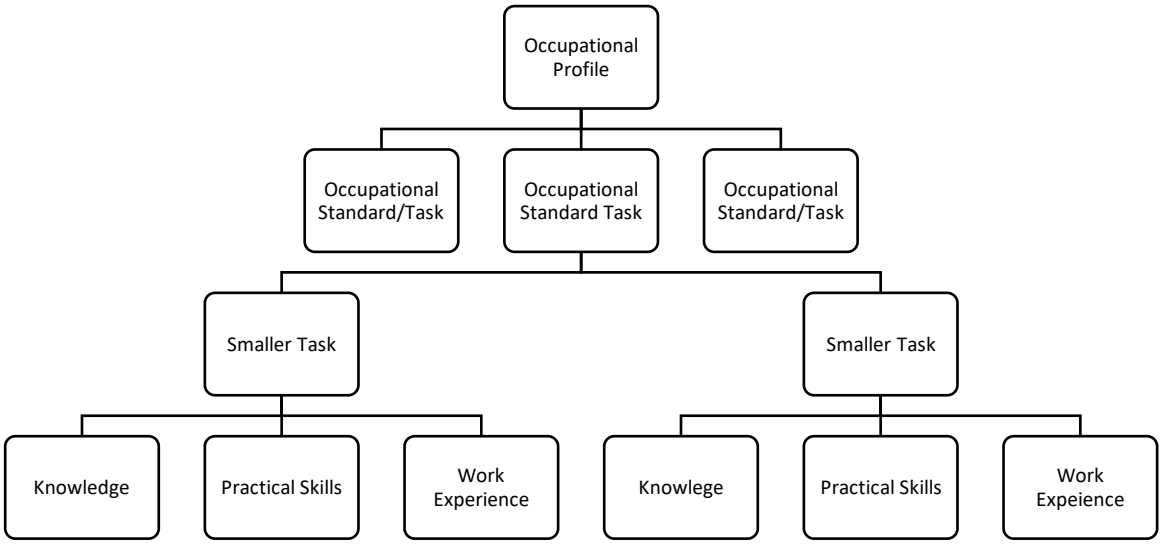
The claim rests on four pieces of evidence. First, as Chapter 6, Section 6.2 (p. 91) showed, the regulatory definitions of occupational standards/tasks are a type of learning outcome due to their focus on task performance through the further specification of "product or service, occupational responsibilities and one or more occupational contexts" (Quality Council for Trades and Occupations & GIZ on behalf of the German Government, 2014, p. 10). The implication is that occupational standards share more similarities with the narrow, task-focused learning outcomes of CBT than with broader notions of competence for occupational practice. Second, in Chapter 6, Section 6.3, the example from the first intended curriculum (curriculum framework) for plumber showed how the templates, together with the development process, have similarities to design down from task performance-based occupational standards. The CBT approach of design down was evident in the reduction of disciplinary knowledge to procedural knowledge in the knowledge modules, where the focus was on knowledge that was necessary for task performance. (The form of design down is discussed later under this claim.) Third, as laid out in Chapter 6, Section 6.3 (p. 94), design down—which requires a learning outcome to represent a single, measurable outcome, often through task performance—was experienced by one of the plumber expert practitioners when the regulatory body required one outcome for water pressure. Fourth, the evidence in Chapter 7, Section 7.2.1 (p. 124) showed that policymakers and facilitators had adopted a diminished view of know-how, by assuming that framing knowledge requirements only relevant to the application of theory in task performance could inform the intended curriculum contents. In other words, the policymakers and facilitators' views held assumptions that led to a diminished notion of know-how which was embodied in the focus on task performance in the templates and development processes of occupational qualifications and their intended curricula. In contrast, expert practice is defined based on specialised knowledge, where systematically organised knowledge contains both know-that and know-how, together with inferential comprehension abilities.

Bringing the literature and the evidence together shows yet more clearly how the reduction of knowledge types occurs in the intended curriculum contents. To recap, the evidence in Chapter 6 Section 6.2 (p. 91) showed that in general, a broad view of competence seems to be the policy intention for occupational qualifications, where occupational standards are broad competencies articulated as an occupation's main tasks. This broad view of competence has similarities to Pam Christie's (1997) reflections—discussed in Chapter 1, Section 1.1 (p.4)—on the early days of the National Qualifications Framework, when competence was viewed as a broader concept than what was eventually implemented in outcomes-based qualifications. At first glance, occupational qualifications and their intended curricula seem to draw on a notion of competence, through occupational standards/tasks, which is much broader than the notion found in narrow tasks in outcomes-based qualifications. However, I argue that how the occupational standards/tasks are defined and then used in a 'design down' process to derive intended curricula contents is similar, if not identical, to CBT approaches. The trouble with occupational qualifications and their intended curricula having similarities to CBT approaches is that they likely contain the same inherent problems as previous outcomes-based qualifications—they do not disclose curriculum content (Allais, 2012a; Shalem et al., 2004; Shalem & Slonimsky, 1999; Wheelahan, 2015; Wolf, 2001; Young & Gamble, 2006).

Christie's (1997) reflections on the early NQF illuminate understanding of the structure of the first intended curriculum (curriculum framework) for occupational qualifications: once again, policymakers have intentions of implementing a broad notion of competence; however, contrary to these intentions, the prescribed processes and standardised templates for curriculum development entrench CBT approaches such that the specified curriculum content moves away from the broad notion of competence and narrows competence to task performance. To a certain extent, the instructional nature of the standardised templates reflects the argument made by CBT advocates that the earlier failures of competency-based training were based on, what Allais (2012) has referred to as, poor implementation, where learning outcomes were misinterpreted by education institutions. In this line of thinking, more prescription was thus needed, such as in form of the regulatory instructions for standardised templates, to further guide education institutions in interpreting task performance-centred outcomes. What the evidence in Chapter 6, Sections 6.3 and 6.4 shows, though, with regard to the intended curricula is that further specifying work/occupational task performance, through knowledge, practical skills, and work experience module contents, leads to a process of restating the task and delineating the mechanistic steps to

perform that task. The development process, in sum, reveals how the standardised templates lead to a reduction in types of knowledge.

In Chapter 6, Section 6.2, the evidence showed that the formation of occupational standards/tasks draws on assumptions about identifying the main task that needs to be performed in occupational practice and associating the main task with a product or service, occupational responsibilities, and occupational context. The instructions for the first intended curriculum assume that occupational standards/tasks can be interpreted for curriculum contents. The regulatory body's templates stipulate the specific formulation of an occupational standard/task (main task) and the way in which the knowledge, practical skills, and work experience modules are to be derived for the performance of the occupational standard/task. Figure 8.1 is a visual representation of this process and is further explained below.



19 Figure 8.1 Visual Representation of Design Down from Occupational Standard/Task into Occupational qualifications and Intended Curricula

Figure 8.1 captures how an occupational standard/task is broken down into smaller tasks that together enable the performance of the broad occupational standard/task. It shows that knowledge, practical skills, and work experience modules are derived for the performance of the smaller tasks in a manner that is similar to Shalem et al.'s (2004) outcomes-based alignment in two ways. First, there is an assumption that work tasks can convey the knowledge and skills required for the intended curricula content. This assumption is found in the repeated restatement of knowledge and practical skills as tasks in the module titles and topics covered. In other words,

there is an assumption that tasks in the workplace fully contain the knowledge and practice of an occupation. Critics of competency-based training, such as Allais (2012), Shalem et al. (2004), and Wolf (2001), have shown that it is challenging to move from a task to curriculum contents; or in this case, from many smaller tasks grouped under an occupational standard/task to the first intended curriculum. The problem lies, as Wolf (2001, p. 460) has explained, in the notion that underpinning knowledge can be "extracted" or "induced" from outcomes/tasks for curriculum content.

Second, the process by which the occupational standards/tasks that form the occupational profile are used to derive the first intended curriculum involves design down. This process in occupational qualifications is not identical to the design down process captured by Allais (2006) and Wolf (2001) in their descriptions of how curriculum contents are derived from a single outcome. Nonetheless, I argue that the breaking down of broad occupational standards/tasks into smaller tasks, combined with the subsequent isolation of the first intended curriculum content necessary for the smaller tasks' performance, reflects a form of design down. This design down raises concerns regarding the scope and depth of specialised knowledge and the prioritisation of procedural knowledge in the curriculum frameworks of occupational qualifications, similar to the concerns raised by Shalem et al. (2004) and Wheelahan (2015) about the use of learning outcomes that are subsequently designed down into qualifications and curriculum.

In summary, Figure 8.1 (p. 152) shows how the narrowing of knowledge, practical skills, and work experience curriculum content occurs in relation to what is relevant to the performance of multiple, smaller tasks that ultimately lead to the performance of the occupational standard/task. I argue that this narrowing of curriculum content leads to a reduction in the types of knowledge, specifically disciplinary knowledge as part of know-that, which has consequences for the development of know-how. The reduction of know-how to task performance has the overall effect of compromising the specialised knowledge necessary for occupational capacity. Next, I argue that the development processes and standardised templates used for the intended curricula break down systematically organised knowledge for teaching and learning.

8.3 Claim 2: Fragmentation of Systematically Organised Knowledge by Sequencing of Curriculum Contents Based on Tasks

To recall, Chapter 3 identified systematically organised knowledge as a concept, under the heading of specialised knowledge, as the basis of professional judgement. Winch (2010) explains that there are two types of propositional knowledge: *kenntnis* (contingent knowledge and discrete propositional knowledge) and *wissen* (organised propositional knowledge, often referred to as scientific and theoretical knowledge). In addition to these two types of propositional knowledge, Winch draws in Brandom's notion of inferential comprehension abilities, which involve making connections within the systematically organised knowledge that underpins professional judgement and form the basis of the justification of decision-making required for practice. Central to Winch's work is the idea that both *kenntnis* and *wissen* are required for the development of inferential comprehension abilities required for specialised knowledge, which is part of occupational capacity for expert practice.

Using Winch's conceptualisation of knowledge to frame the evidence shows how systematically organised knowledge is fragmented in the intended curricula contents, which answers the sub-question on the form and design of occupational qualifications and their intended curricula. Under the previous claim, I argued that the prescribed templates and development processes reduce the knowledge types in the curriculum contents to only that which is necessary for task performance, with an emphasis on *kenntnis*-related knowledge. Under this claim, I argue that the process of *sequencing* the curriculum contents based on tasks further breaks down systematically organised knowledge. This claim is based on two pieces of evidence. First, the development processes remove the organisation of disciplinary knowledge structures in the second intended curriculum (national occupational curriculum content). The evidence in Chapter 6, Section 6.4 (p. 104), using examples from the second intended curriculum, showed that the way in which curriculum content was sequenced fragmented knowledge areas, as the inherent logic of a body of disciplinary knowledge was broken down by framing knowledge in terms of the knowledge underpinning work tasks. Second, based on my workshop observations, in Chapter 6, Section 6.4.1 (p. 115), I explained how sequencing the curriculum contents was challenging, as practice often draws on systematically organised knowledge, which is difficult to break down according to the parts of knowledge required for task performance.

To understand how systematically organised knowledge is broken down, here, it is worth recalling the two examples from the second intended curriculum for electrician discussed in Chapter 6, Section 6.4. The second intended curriculum template used learning areas, with learning projects structured according to the three phases of a work situation (planning, execution, and evaluation), which reinforced the focus on task performance in curriculum content. Example 2 showed how learning areas—i.e. preparing for or performing 'main' work tasks, such as "Learning Area 1: Prepare for work" or "LA5: Install wiring systems and accessories (for low voltage) in domestic buildings and premises"—had similarities to the occupational standards/tasks shown in Figure 8.1 (p. 152). Learning areas were composed of learning projects that were similar to the smaller tasks in Figure 8.1. The learning project title in Example 2, "Install cables and conductors into wire ways", broke down the contents of the knowledge, practical skills, and work experience modules for the performance of the task in the learning project title. The learning projects are the basis for prescribed lessons plans that sequence curriculum content according to the learning areas for the duration of a learning programme. By prescribing lessons plans that are focused on the task performance represented in the learning project, the fragmentation of disciplinary knowledge is seen, as the knowledge module contents are centred on the underpinning knowledge for the learning project. Thus, knowledge is identified and allocated due to its relevance for performing the work task identified in the learning project, rather than taught in disciplinary knowledge structures where propositions are related to the body of knowledge.

Combining the insights from Example 3 on knowledge-focused learning areas and projects (Chapter 6 Section 6.4 p. 104) with the views of policymakers and facilitators (Chapter 7, Section 7.2.1 p. 124) explicates the underlying assumptions further. By framing electrical theory as preparation for work, which requires a direct relationship to application in a work task, the second intended curriculum for electrician seems to be communicating that the calculations for a work task—i.e. the 'application' of electrical theory—are the most important. Based on how specialised knowledge is theorised in Chapter 3, Section 3.3 (p. 41), I argue that by foregrounding the calculations (i.e. focusing on task performance) what is missed is that the calculations are based on principles of electrical theory forming part of the physics curriculum; it is an understanding of the theory that makes the calculations (i.e. practical application of the theory) possible. By foregrounding the calculations or 'application' of the theory, what may be lost is the connection to the systematically organised knowledge that underpins calculations and problem-solving in practice; this missing connection being that applying calculations at a worksite requires combining know-how based on systematically organised knowledge (disciplinary knowledge, knowledge by

acquaintance, and practical knowledge) with inferential comprehension abilities (which include problem-solving).

In Chapter 6, Section 6.4.1 (p. 115), I discussed workshop observations and interview data that showed the challenges of using work tasks, with their associated knowledge and practical skills, to sequence the second intended curriculum. Workshop participants struggled to align knowledge and practical skills to tasks for the successful performance of an occupational/work task. What exacerbated the problem was the requirement to apply knowledge and practical skills specified in the task performance. The difficulty with focusing on task performance is the negation of the instances when there might be more knowledge and practical skills required up front to perform an occupational/work task. The example of water pressure from the curriculum framework for plumber, discussed in Chapter 6, Section 6.3, illustrates that understanding subject knowledge and know-how in practice might require teaching and learning that grows in complexity over time. Subject knowledge, such as of water pressure, is relevant to all plumbing practice; yet the standardised templates focusing on task performance required that only one outcome contain all the curriculum content for water pressure.

To summarise, the discussion under Claim 1 first drew out how having task performance as the starting point of occupational standards/tasks, which are then designed down into the first intended curriculum, restricts the types of knowledge to only the knowledge that is "applied". Building on this, the discussion under Claim 2 has shown the breakdown of systematically organised knowledge when the first intended curriculum, along with some additions, is then used to sequence the content of the second intended curriculum in a task-based structure of learning areas with learning processes. What occurs is the breakdown in the representation of specialised knowledge because the task-based structure fragments systematically organised knowledge for teaching and learning through reducing the types of knowledges and simultaneous using a piecemeal approach to their associated structures for bodies of knowledge based on task performance. In focusing on only what is necessary to apply in a task, systematically organised knowledge is compromised because certain types of knowledge are not included and propositions are removed from their knowledge structures and associated instead with a work task. Consequently, it is difficult to develop inferential comprehension abilities that are a result of making connections between systematically organised knowledge.

8.4 Claim 3: The Effects of the Exclusion of Actors through the Distorted Version of 'Work Readiness' Shaped by the State

The third claim addresses the second sub-question by identifying the actors/stakeholders and their roles in occupational qualifications and their intended curricula, drawing on concepts under the social organisation of occupations in Chapter 3, Section 3.4 (p. 49) and the evidence in Chapter 7, Section 7.2 (p. 123). The claim is that the state's actions with regard to occupational qualification reforms are similar to those of institutions that shape occupations according to their agenda (Chapter 3, Section 3.4.2 p. 54). In the Chapter 3 discussion on institutions, I drew on Friedson's (1973) administrative principle of organising work, which illustrates how an employer shapes occupations according to its production goals. Here, I argue that the state, through standardised templates and instructions for development processes, shapes occupational qualifications and their intended curricula to its distorted version of 'work readiness', which undermines the roles of other actors (professional bodies, employers, and other institutions) in developing qualifications and curriculum. The section first describes the state's distorted version of work readiness, which is followed by a discussion on how this agenda affects the social organisation of occupations.

A key claim of the state's approach to the development of occupational qualifications and their intended curricula is that curriculum contents draw on the input of stakeholders as expert practitioners (see Chapter 5, Section 5.2 p. 74). In the following paragraphs, I draw on evidence that shows contrasts between how policymakers, facilitators, and expert practitioners portray the role of stakeholders. In terms of policy, the occupational standards are intended for "industry and labour market confidence", where the Occupational Qualifications Sub-Framework "comprises the standards determined by industry or a profession, based on standards recognised by industry or the profession" (National Qualifications Act: Revised Occupational Qualifications Sub-Framework, 2020, p. 17). What the evidence in Chapter 5, Section 5.3.2 (p. 85) showed, though, was the lack of employer participation in workshops to develop occupational qualifications and their intended curricula. Additionally, in Chapter 6, Sections 6.3.1 (p. 103) and 6.4.1 (p. 115), I showed how expert practitioners' input was restricted based on the rules for standardised templates. The implication is that development processes, which the policy articulates as being determined by industry and the profession, often do not have employer participation and have restricted participation from the profession. Under this claim, based on the evidence presented in Chapters 5, 6, and 7, I thus argue that the design form of occupational qualifications is shaped by the state's distorted version of work-readiness rather.

In Chapter 5, Section 5.2 (p. 74), I took a close look at the kind of stakeholders involved in the development processes and found that expert practitioners are a combination of representatives of industry professionals, public and private college lecturers, trade test assessors, relevant sectoral training body officials, and department officials. While the development processes may involve varied stakeholders, three examples serve as evidence to show that input in the development processes was restricted by the instructions for the standardised templates that were followed by the facilitators and enforced by the regulator. First, in Chapter 6, Section 6.3 (p. 94), a plumber expert practitioner explained how all the content on water pressure needed to be captured under a single outcome, with regulatory officials intervening to shape the contents provided by the expert practitioners. Second, in Chapter 6, Section 6.4.1 (p. 115), plumber and electrician experts explained how the focus on work tasks was challenging to translate into curriculum contents which required 'real-life' work scenarios that could not capture the complexity of knowledge, practical skills, and problem-solving in practice. Third, in Chapter 6, Section 6.4.1, drawing on my observation of workshops, I highlighted the difficulties experienced by expert practitioners in sequencing curriculum content according to the performance of work tasks which often required more 'knowledge' up front for a task, such as 'Install a computer'. The evidence shows that while expert practitioners might have represented a wide group of stakeholders/actors, their input was ultimately shaped by the state's standardised templates for occupational qualifications and their intended curricula.

The evidence also showed that a combination of the regulatory instructions for standardised templates, facilitators trained to use the templates, and regulatory actors who enforced the 'rules' of the templates drive the contents of occupational qualifications and their intended curricula. The evidence in Chapter 7 reveals three assumptions underlying the state's actions vis-à-vis occupational qualification reforms through a series of workshops focused on populating standardised templates that elicit specific content in a set structure for intended curricula. First, the interviews with policymakers and facilitators, as presented in Chapter 7, Section 7.2.1 (p. 124), show that the state assumes that foregrounding work task performance (Claim 1) to derive curriculum contents will solve the problem with 'application of theory' in previous vocational education programmes, which led to the lack of 'work readiness' of students. However, using the concepts discussed under systematically organised knowledge in Chapter 3, Section 3.3.1 (p. 42) and under occupational practice in Chapter 3, Section 3.3.3 (p. 46) reveals that that the state's understanding of 'application of theory' leads to minimising know-how by assuming that

occupational practice based on specialised knowledge can be reduced to a series of performed tasks.

Second, the state assumes that by enforcing a rigid, generic qualification structure for all vocational learning programmes, training requirements can fit into one structure. In contrast, the electrician expert practitioners interviewed revealed problems such as the incongruity between the current intended curricula contents and types of workplace training available (Chapter 7, Section 7.2.2 p. 128), both of which are minimum requirements to qualify for the trade test that leads to certification to practice. Thus, the rigid, generic qualification structure is difficult to navigate when specialist curriculum content is required prior to workplace training. Third, the state assumes that seeking foreign assistance for the intended curriculum contents in intended curricula processes (Chapter 7, Section 7.2.3 p. 132), regulatory structures, and development processes for occupational qualifications and their intended curricula (Chapter 7, Section 7.2.3) signifies that vocational learning programmes will meet the requirements for international comparability and international best practice. Yet the evidence in Chapter 7, Section 7.2.3 shows how input from foreign consultants in the electrician occupational qualification and intended curricula did not consider education levels in South Africa in comparison to those in high-income countries. Both the second and third assumptions highlight how the state's occupational qualifications' development processes and standardised templates do not sufficiently consider the South African context.

A common theme that emerges from the evidence discussed in relation to Claim 3 is that the state, through regulatory structures and intended curricula focused on task performance hinders other actors from creating or engaging with the relationships in the social organisation of occupations, which works together with specialised knowledge to support the development of occupational capacity for expert practice. State regulation, as discussed in Chapter 3, Section 3.4.3 (p. 54), is part of the social organisation of occupations because the state is located in relationships with professional bodies and institutions. State regulations can either act as a mediator between actors to reach the best possible outcome for all or play a domineering role by placing the agendas of certain actors before those of others. Where state regulation and self-regulation of occupations exist together, the state can mediate the needs of actors to protect the public in the realms of both the economy and public utilities, while experts in professional bodies are able to monitor and regulate training and practice (Standing, 2009).

Ideally, state regulation and self-regulation work together with other actors in the social organisation of occupations, which draws on Clarke et al.'s (2013, p. 933) notion of occupational capacity as based on a training approach. The training approach captures occupational labour markets, which are typically collectively and industrially organised. In contrast, here, the state has shaped a distorted version of work readiness based on task performance that restricts input from other actors through regulatory and development processes and using standardised templates for occupational qualifications and their intended curricula. I argue that in doing so—i.e. shaping vocational learning programmes according to a distorted version of work readiness that prioritises task performance in occupational qualifications—what is lost are the relationships between actors and their associated roles in the social organisation of occupations and specialised knowledge development that support occupational capacity for expert practice.

8.5 Claim 4: Lack of Recognition of Social Factors Influencing Occupational Training and Practice

Whereas the previous claim was based on how the state's distorted version of work readiness occurs, this claim discusses how the state's agenda causes a lack of recognition of other social factors that negatively affect the development of occupational capacity in training. Returning to the concepts discussed in Chapter 3, the claim is conceptually based on how the development of occupational capacity draws on both specialised knowledge and the social organisation of occupations, where conditions in the social organisation of occupations either hinder or support the development of specialised knowledge. The implication for the development of occupational capacity is that while the state shapes occupational qualifications to focus on its agenda of work readiness, the role of employers and professional bodies in social, economic, and political processes still shapes occupational training and practice, be this through their actions or their lack thereof. In order to understand why the state is unable to recognise social factors, the claim needs to be located in how the state views the problems with previous vocational learning programmes in the context of the solutions found in occupational qualifications.

The problems with previous vocational learning programmes were identified in Chapter 1, Section 1.4 (p. 11), and they included students' lack of work experience and graduates' high unemployment levels. First, close associations were made between lack of work experience and the high unemployment levels of graduates of NATED programmes by Bird (2010). In the standardised templates for occupational qualifications—discussed in Chapter 6, Section 6.3 (p. 94)—the lack of

work experience seems to have been 'solved' by the mandatory addition of work experience modules. Second, Allais (2012b) explained how research at the time showed that NATED qualifications led to neither higher education nor employment. Underlying the emphasis on meeting industry needs (see Chapter 7 Section 7.2.1 p.124) in occupational qualifications is the idea that providing graduates that industry/employers want will improve employment levels. Chapter 6, Sections 6.2, 6.3, and 6.4 identified determining industry needs as a reoccurring theme in the development and use of occupational standards for intended curriculum contents. Facilitator 2 described the needs in terms of "what people working in that particular occupation do on a daily basis" (Chapter 7, Section 7.2.1). Based on the identification of these previous problems, the design form of occupational qualification reforms has focused on prescribing curriculum content in line with the state's agenda of work readiness, seemingly without searching for other social factors that could be contributing to the student's lacking work experience and appropriate preparation for practice.

Looking at the evidence through the conceptual lens of the social organisation of occupations, Chapter 7, Section 7.3 (p, 136) presented three groups of social factors in workplace training and the development of occupational capacity. Broadly, they were as follows: employers' reluctance to provide workplace training, unconducive training conditions in the workplace, and occupational experts' concerns with broader occupational goals, which seem not to have been considered in the policymakers' goal of meeting employer/industry needs in occupational qualification reforms. With regard to the first group of social factors, discussed in Chapter 7, Section 7.3.1 (p. 136), the evidence pointed to two factors that could lead to reduced opportunities for workplace training and employment. First, master craftsmen/senior artisans struggle with understanding students' requirements for training modules, due to ongoing regulatory changes in language and terminology, which could be contributing to employer reluctance to train. Second, both the electrician and plumber experts interviewed reflected on the reduced employment opportunities for electricians and plumbers, with the only exception being for isolated skills shortages for certain specialisations in the two occupations. Both factors could be contributing to employer's reluctance to train. These factors affecting employer motivations stand in contrast with the views of policymakers (Chapter 7, Section 7.2.1 p.124) that have focused the design form of occupational qualification reforms on prescribing curriculum contents for task performance that entails students 'applying the theory' they have learnt. The state's focus on prescribing curriculum contents for colleges stands out because vocational training requires training both at the college and at the workplace to qualify for the trade test. This raises the question as to why the standardised templates

for occupational qualifications under the policy reform focus on curriculum content at colleges, while seeming to neglect the training that must occur in the workplace—this focus is particularly problematic when considering the second group of social factors, which highlight the problems with workplace training conditions.

The second group of social factors, discussed in Chapter 7, Section 7.3.2 (p. 140), contain two aspects of conditions in the workplace that could undermine training. First, in the context of increased production demands, master craftsmen/senior artisans need to balance the pressures of the production schedule with training students. For example, a master craftsman/senior artisan needs to train a student on the machines used in their practice; however, taking the time to train the student to fix a problem on a machine takes longer and holds up production. Unfortunately, when production and training demands clash, production pressures are often prioritised over training. This condition reflects how institutions driven by the Freidson's (1973) administrative principle of organising work shape occupations according to their production agenda, which can undermine workplace training essential to developing occupational capacity for expert practice. Second, the evidence (in Chapter 7 Section 7.3.2 p. 140) shows that stricter occupational health standards and their associated implications in the workplace can lead to compromised training for students, as opportunities for autonomous practice can be dangerous and now require longer time periods from master craftsmen/senior artisans away from production for safety checks. One of the reasons workplace training is important is that students develop the ability to practice autonomously. What was expressed in the interviews, though, was that master craftsmen/senior artisans were reluctant to provide opportunities for autonomous practice due to any adverse implications for the employer in the event of a student getting injured or equipment getting damaged. The implication is that workplace training may not provide sufficient development of know-how required to practice autonomously. While policymakers have focused on prescribing curriculum contents in occupational qualification reforms, the two aspects discussed here show that problems in workplace conditions can undermine the development of know-how in vocational training.

The third group of social factors, discussed in Chapter 7, Section 7.3.3 (p. 142), shows how the broader goals of the occupation can be compromised by narrowly defining training according to current work tasks. The conceptual discussion on specialised knowledge explicated the importance of the systematically organised knowledge (disciplinary knowledge, knowledge by acquaintance, and practical knowledge) and inferential comprehension abilities that underpin practice. Further,

inferential comprehension abilities, which are based on making connections between bodies of knowledge in know-that and know-how, support problem-solving in occupational practice. The evidence showed how 'fault-finding' in the electrician's occupational practice had been declining due to technological changes that made replacing parts cheaper than fixing parts. Nevertheless, electrician experts were concerned with the increased pressure to reduce curriculum content on 'fault-finding' because problem-solving is an inferential comprehension ability developed in the process of developing the specialised knowledge base that underpins expert practice. The state has structured occupational qualifications to derive curriculum content from current occupational/work tasks for curriculum contents to meet 'employer needs'; yet there is little room to negotiate and discuss the broader occupational goals of a profession based in the development of inferential comprehension abilities for occupational capacity.

To recall Chapter 3, Section 3.4.1 (p. 51), professional bodies define, maintain, and innovate their practice based on specialised knowledge. Thus, the state's agenda of work readiness in occupational qualifications, with its focus on current occupational/work tasks as the basis of curriculum content, leads to training that does not support the broader goals of occupations, thereby undermining the development of occupational capacity for expert practice. Additionally, it is worth considering Streeck's (2012) work on general and specific skills (detailed under Skill Section 3.3.2 p. 44), and how they are related to context here. His work showed how craft skills and general skills were influenced by relationships and conflicts among trade unions, employers, and workers in the German and Anglo-Saxon skills formation systems during the industrial period. He highlights that in contrast to the Anglo-Saxon system, German employers were able to deploy new technology rapidly, which was connected to German workers having both advanced specialised skills and general skills due to widely accessible and publicly supervised apprenticeships. While employers in the German system were willing to invest large amounts of money in the development of skills, trade unions supported companies upskilling employees for their benefit while simultaneously pushing for more general training for their members (Streeck, 2012, p. 319). It is important to note that crucial actors in the social organisation of occupations in the German context prioritised both high-level skills and general skills, which gave German industries a unique competitive advantage.

Streeck's (2012) work is important to understanding how conflicts and power dynamics in the social organisation of occupations shape skills development, and ultimately, occupational capacity. His comparison of the Anglo-Saxon and German skills formation systems helps in understanding

the state's actions in the design form of occupational qualification reforms, by clarifying that actors in the social organisation of occupations work in relationships that either support or hinder occupational training and practice. The evidence in this thesis shows that the state's agenda, with its distorted agenda of work readiness, shapes skills development according to task performance, where there is little room for negotiation and mediation among stakeholders' varied agendas (professional bodies, trade unions, employers, and educators) to jointly arrive at the best possible outcome for all parties.

The evidence for Claim 4 highlights employers' reluctance to participate in workplace training, the adverse workplace conditions for training, and the state's disempowerment of occupational experts (professional bodies) in defining training to support occupational goals, as factors within the social organisation of occupations. Returning to the concept of occupational capacity developed in Chapter 3, I argue that the problem with the state's adoption of a distorted version of work readiness in occupational qualification reforms leads to a lack of recognition of factors in the social organisation of occupations (external force), and the lack of negotiation or mediation can undermine the development and content of specialised knowledge (internal force) in the design form of occupational qualifications and their intended curricula for vocational learning programmes (which occur at both colleges and workplaces).

8.5 Concluding Discussion

In this chapter, I have drawn out four claims from the evidence presented in Chapters 5, 6, and 7. The four claims combined reveal how the development of occupational capacity in occupational qualifications is undermined. The first and second claims have focused on how specialised knowledge is compromised through the state's standardised templates and development processes, where intended curriculum contents are derived from occupational/work tasks that prioritise task performance, which reduces types of knowledge and breaks down systematically organised knowledge. The third claim has explained how the design form of occupational qualification reforms embodies the state's agenda of shaping vocational learning programmes according to a distorted version of work readiness in occupational qualifications, which train students to perform occupational/work tasks. The state's distorted version of work readiness contrasts with the nature of specialised knowledge—which is shaped by (and reliant on) the social organisation of occupations—in that it excludes the roles of other actors (institutions and professional bodies) required for the development of occupational capacity for expert practice. The fourth claim has

provided insights into factors within the social organisation of occupations that affect the development of occupational capacity and that are not recognised by the state's agenda in the design form of occupational qualification reforms. Social factors such as employers' reluctance to train, unconducive workplace conditions for training, and a profession's broader occupational goals are not identified when occupational qualification reforms are focused on prescribing curriculum content on occupational/work task performance. The combination of these four claims is the basis on which I argue that the design form of occupational qualifications constrains vocational education learning programmes in South Africa, because the reforms have failed to address both the specialised knowledge and the social organisation of occupations that form occupational capacity.

In this chapter, I have shown that aspects of specialised knowledge and the role of actors in the social organisation of occupations are connected. In the standardised templates that were developed through the recent occupational qualification reforms, task performance-focused curriculum content is problematic due to the nature of specialised knowledge development for practice that restricts knowledge types and breaks down systematically organised knowledge. I argue that problematic nature of specialised knowledge is a result of the state's distorted version of work readiness found in standardised templates and development processes of occupational qualifications which excludes the role of key actors and lacks recognition of factors in the social organisation of work. Thus, the connection found in occupational qualification reforms that I argue is that vocational education policy that seeks to shape occupational training needs to consider both specialised knowledge and the roles of actors in the social organisation of occupations to fully engage with the development of occupational capacity for expert practice.

In Chapter 3, I foregrounded occupational capacity as the requirement for expert practice, which is shaped by an internal force of specialised knowledge and an external force comprising the social organisation of occupations. This implies that training to practice an occupation means the development of occupational capacity. Hence, vocational training requires both specialised knowledge and actors within the social organisation of occupations to support and develop occupational capacity for practice. In occupational qualifications and their intended curricula, the state-led reforms both compromise specialised knowledge and fail to recognise factors in the social organisation of occupations. Thus, I argue that the design form of standardised templates for occupational qualifications constrains vocational learning programmes because it undermines the development of occupational capacity (the requirement for expert practice) in the programmes.

CHAPTER 9 : RESEARCH CONTRIBUTIONS

9.1 Overview

This chapter outlines the two contributions that this thesis makes to current and future research. First, the thesis contributes to research uncovering the general principle of competency-based training approaches degrading curriculum. The analysis showed that occupational qualifications and their associated intended curricula relates to occupational standards, which are similar to but somewhat broader than learning outcomes that are designed down into guidance for curriculum content. Second, the research makes a theoretical contribution by strengthening conceptual understanding of occupations through the development of an occupations conceptual web (Chapter 3). The occupations conceptual web contributes to ongoing theoretical work by scholars on alternatives to CBT approaches in education reforms, such as Wheelahan et al. (2012, 2015) on occupational/vocational pathways and Gamble (2021) on broad-based occupational qualifications.

The contributions of this thesis are the result of challenges faced in analysing occupational qualifications in South Africa. As a vocational education policy reform, occupational qualifications seem to capture the intention of national regulatory bodies to move away from outcomes-based qualifications and towards a more holistic occupational approach to training for practice. Initially, it was a struggle to distinguish what might indicate a holistic occupational approach vs. a CBT task-based approach to qualifications and curriculum in the data. In contrast to the literature on the characteristics of CBT approaches, the characteristics of a holistic occupational approach to training for expert practice draw from scholarship in different disciplines, namely philosophy of education, sociology of work, and political economy.

In this chapter, I discuss this thesis' contributions concerning CBT-led education policy reforms and alternatives to CBT approaches. My analysis has shown that the new system of occupational qualifications has not parted from the forms that led to CBT approaches and cannot adequately address the requirements of developing occupational capacity for expert practice in the workplace. The next section discusses how the analysis in this thesis makes a theoretical contribution by identifying a variation of CBT in education reforms and by deepening an understanding of the alternative found in occupational pathways.

9.2 South African Occupational Qualifications as a Variation of CBT

The first contribution is based on the analysis of occupational qualifications and their intended curricula, which seem, at first glance, to be different from previous unit standard qualifications in South Africa. My analysis has shown that occupational standards and their subsequent breakdown into smaller tasks are similar to learning outcomes. A form of 'design down' derives curriculum contents from the smaller tasks under the main occupational standards/tasks. Put differently, occupational standards hold to the core of competency-based training, which assumes that tasks can communicate knowledge requirements for curriculum development.

The thesis contributes to existing work on competency-based training. My analysis has shown that CBT approaches are to be found in the occupational qualifications designed around task performance. On the surface, standards-based occupational qualifications address the scholarly critiques of competency-based training. In particular, the prescribed addition of knowledge in occupational qualifications seems to address the concern about lack of knowledge or fragmented knowledge in outcomes-based qualifications. Additionally, the practical skills and work experience modules seem to address workplace training requirements. However, the thesis has shown that the prescribed template for the curriculum framework shows use of task-focused curriculum design approaches. The evidence of task-based design highlights a version of CBT in which the primary method involves grouping a specific occupation's main tasks and then designing down curriculum contents to support the performance of smaller tasks for the main tasks. Based on the existing literature, I argue that this policy-driven method of 'design down' from an occupation's primary tasks indicates a CBT approach.

Competency-based training foregrounds the notion that competence defined in terms of task performance can be used to derive curriculum content for learning programmes. However, critiques of CBT have shown how outcomes fragment learning by focusing on task performance at the expense of knowledge in curriculum content (Clarke et al., 2013; Shalem et al., 2004; Wheelahan, 2015; Young & Gamble, 2006). The literature highlights how it can be difficult to derive meaning from task-focused learning outcomes, to articulate into curriculum contents for learning programmes (Allais, 2012a; Shalem et al., 2004; Wheelahan, 2015). Shalem and Slonimsky (1999) and Wolf (1989) have explained that the interpretation problems faced by educators with CBT often lead to learning outcomes that become increasingly complex, with details being continually added to clarify their meaning. South African policy has often cited the poor

implementation of CBT, rather than CBT approaches themselves, as the problem (Allais, 2012; Minister of Education and Minister of Labour, 2007). Viewed in a different light, occupational qualifications containing further prescriptions on how occupational standards/tasks can be interpreted for curriculum content could be seen as a solution to previous problems with CBT implementation, where educators struggled with interpreting learning outcomes.

This thesis has found that occupational qualifications and their intended curricula draw on CBT approaches containing the same logic as previous outcomes-based qualifications; i.e. the idea that learning outcomes can translate into curriculum content. In a similar vein to critiques of CBT, my research has shown that the instructions in templates for occupational qualifications and their intended curricula contain logic intrinsic to CBT: they exclude types of knowledge not directly related to task performance and entail removing propositions from their bodies of knowledge—which altogether breaks down systematically organised knowledge. Therefore, I argue that the changes involved in the move from outcomes-based qualifications to standards-based occupational qualifications and their intended curricula are superficial because the approach being used still holds to the CBT logic that task performance can be used to derive curriculum content.

In South Africa's occupational qualifications is confusing when considering the history of outcomes-based qualifications in the country. As discussed in Chapter 2, Christie (1997) has reflected that the initial conception of competence was broader than the subsequent notion of competence implemented in learning outcomes. She explains that competence included the aspects of theoretical knowledge, practical skills, and application in different contexts. In contrast, the implementation of competence in outcomes-based qualifications foregrounded a narrow mechanistic definition of task performance (Allais, 2012a; Muller, 2009; Young & Gamble, 2006). I argue that in some ways, standards-based occupational qualifications and their intended curricula repeat the pattern seen in the early days of the National Qualifications Framework and outcomes-based qualifications. The analysis has shown that starting with a broad notion of competence in occupational standards, but following it up with implementation of the CBT methods of learning outcomes and 'design down' to derive contents for the intended curricula, has the effect of narrowing competence to task performance. The repetition of this pattern is problematic for South Africa, as well as other countries seeking to move away from CBT-based education reforms and their associated problems.

The standardised templates used for occupational qualifications and their intended curricula in the current South African system represent an interpretation of policy advice that advances the idea of occupational profiles with standards/tasks. A similar notion of developing occupational profiles and curricula can be found in the International Labour Organisation's 2020 practitioners' guide for quality apprenticeships, which contains guidance for developing curricula based on labour market analysis (Aggarwal, 2020). The ILO guide provides a brief roadmap comprised of four steps for apprenticeship programmes: labour market demand analysis, occupational/job analysis, development of occupational standards, and development of curricula. The guide states that using these steps ensures a "close link between apprenticeship programmes and labour market needs" (Aggarwal, 2020, p. 13). The ILO guide and the South African QCTO facilitator's guide contains many similarities. Therefore, those implementing such policy advice elsewhere need to be mindful of how the approach has played out in South Africa, as they consider occupational training regulatory models.

This research provides insight from the South African case for countries engaging in vocational education reform that prioritises using occupational standards or competence statements based on work requirements for training programmes. In South Africa, the policy intention of occupational qualifications reform was to provide more holistic training to prepare students for practice in an occupational field and was arguably an attempt to solve the problems associated with outcomes-based qualifications. However, the breaking down of occupational standards into smaller tasks and the 'design down' process used to derive and sequence the intended curricula contents mean that occupational qualifications are likely vulnerable to the same problems as those faced by outcomes-based qualifications.

As experience with CBT-based reforms over the last few decades shows and as scholars such as Clarke et al. (2013), Shalem et al. (2004), Wheelahan (2015), and Young and Gamble (2006) have highlighted, the focus on task performance in training programmes provides graduates with mechanistic preparation for work that often falls short of what is required in dynamic work conditions. The analysis contributes to the understanding of CBT and its role in degrading the curriculum, which contributes not only to South Africa but also to the United Kingdom and Australia. Policymakers, regulators, and implementers engaged in vocational education reform need to be cautious when using broad notions of competence in qualification and curriculum design, as such an approach can still lead to task-oriented curricula, especially the use of such

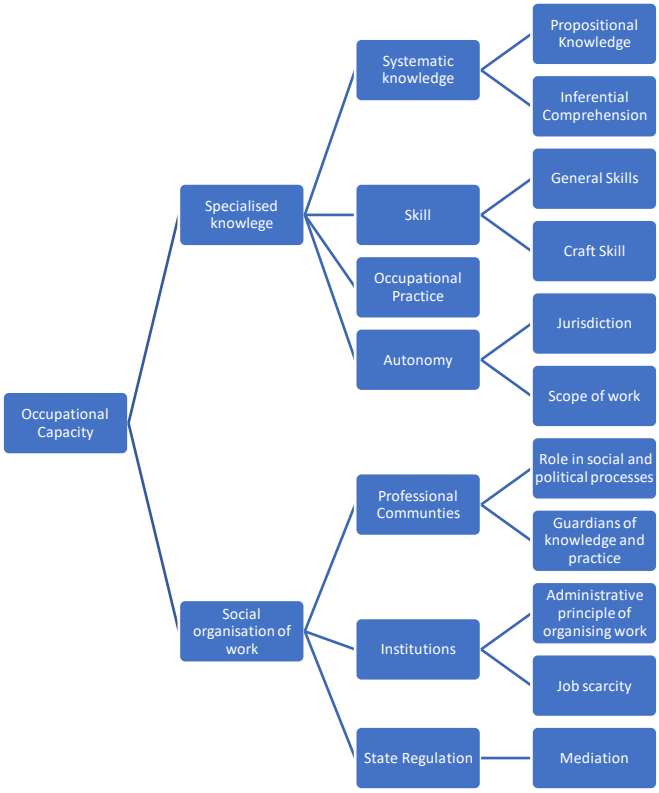
methods as learning outcomes and design down, as found in the South African templates and processes for occupational qualifications and intended curricula development.

9.3 Occupations Conceptual Web

The occupations conceptual web strengthens our understanding of occupations by further developing the notion of occupational capacity as the requirement for expert practice. I argue that understanding how specialised knowledge and the social organisation of occupations relate to each other in the development of occupational capacity provides a foundation for identifying whether reforms of qualifications and their intended curricula constrain, or enable, vocational learning programmes. Specifically, applying the occupations conceptual web to the design form of South African occupational qualifications has shown that the use of task-based occupational standards in driving the intended curriculum contents constrains vocational learning programmes by undermining the development of occupational capacity, by narrowing the scope of specialised knowledge, and by excluding the role of key actors in the social organisation of occupations. My analysis has shown that a task-based approach to identifying occupational practice for training purposes falls short of recognising the full scope of the specialised knowledge and social organisation of occupations that shape occupational capacity. The literature highlights that an understanding of occupational practice in terms of the performance of workplace tasks is too narrow and cannot inform a coherent qualification and curriculum development process (Allais, 2012a; Clarke et al., 2013; Wheelahan, 2015). In further developing the notion of occupational capacity, the analysis has shown that in qualifications and preparation for occupational practice, it is important to consider two dimensions that shape occupations: knowledge and expertise, and the social organisation of occupations. It follows that in a similar vein to Wheelahan et al. (2015) and Gamble (2021), I argue that an occupational capacity-based approach to developing curriculum contents for learning programmes is an alternative to task-based CBT approaches.

My theoretical development of Christopher Winch's concept of occupational capacity in this thesis has primarily been based on bringing together the work of Abbott (1988, 1989), Freidson (1973, 2001), Standing (2009), and Winch (2010, 2013, 2014, 2015). A strong theme emphasised in occupational capacity is that the relationship between training and practice in occupations is subject to two forces: an internal force of specialised knowledge, which encapsulates systematically organised knowledge, occupational practice, skill, and autonomy; and an external force in the form of the social organisation of occupations by professional bodies, institutions, and the state (see

Figure 9.1 below, also Figure 3.1 in Chapter 3). My conceptual analysis of the internal force of specialised knowledge unpacked the key concepts that helped in identifying and analysing the task-based approach to the development of two occupational qualifications and their intended curricula: plumber and electrician. Additionally, I drew on the concepts under the external force of the social organisation of occupations to identify how the state's occupational qualifications reform has implemented a distorted version of work readiness. This distorted version of work readiness is based on task performance that shapes intended curricula contents and fails to recognise factors that hinder the development of occupational capacity.



20 Figure 9.1 Occupations Conceptual Web

The occupations conceptual web (Chapter 3) provides a starting point for theoretically contrasting occupational capacity-based approaches and competency-based training approaches to qualifications and learning programmes. As mentioned earlier, I struggled at first with identifying the kind of data that might indicate a holistic occupational approach as opposed to task-based CBT approaches. The occupations conceptual web started as categories that shaped an occupation, and which could ideally serve, as they did in this thesis, as hooks to organise and analyse data. The simple idea behind the conceptual web was to combine various scholars' work to serve as a prism to explain practice and training in occupations. Winch's work explains the role of types and organisation of knowledge, where specialised knowledge defines, underpins, and advances expert practice. Freidson's work and Abbott's work explain how occupations draw on specialised

knowledge to justify and contend with social forces to establish, maintain, and advance training and practice. Finally, Standing's work explains how various actors' (professional bodies, educators, employers, and the state) actions and agendas in socio-economic and political processes shape occupations. I found that combining different scholars' work in this way enabled me to hold and connect data that spoke to both specialised knowledge and the social organisation of occupations. Abbott (1988), Freidson, (2001), Standing (2009), and Winch's (2010) work agrees that knowledge and society shape occupations. However, their diverse bodies of work foreground different aspects of the relationship between training and practice in occupations.

There is future research to be done based on the occupations conceptual web developed in this thesis, specifically on refining the characteristics what an occupational capacity based vocational learning programme. I started this research project with questions about how education and work relate to each other in occupational training and practice. Broadly speaking, most of the questions that I had were about how an enclosure of occupation could shape training for expert practice, where occupations functioned in relationships between domains of work and education. With this thesis completed and looking ahead to future research, the occupations conceptual web provides the theoretical grounds to ask better questions to understand and investigate the development of occupational capacity for expert practice based in complex political, economic, and social systems.

9.4 Concluding Discussion

This chapter has outlined the contributions that the thesis has made to the literature on competency-based training, and notions of occupation and occupational capacity. The research on South African occupational qualifications provides theoretical insight into, and empirical weight to, how further prescription of CBT approaches occurs in the development of qualifications and curriculum contents, thus, contributing to research uncovering the general principle of competency-based training approaches degrading curriculum. My analysis has shown that this CBT variation hinders the development of occupational capacity in vocational learning programmes by compromising specialised knowledge and failing to recognise the social organisation of occupations. The occupations conceptual web contributes to theoretical work on developing an alternative to CBT, such as the work of Wheelahan et al. (2012, 2015) on occupational pathways and Gamble (2021) on broad-based occupational qualifications. In contrast to task-based CBT approaches, the occupations conceptual web centralises occupational capacity based in specialised knowledge and the social organisation of occupations that foregrounds training for expert practice.

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APPENDICES

Appendix 1: Ethics clearance letter (Protocol Number: 2018ECE005D)

Wits School of Education

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

27 St Andrews Road, Parktown, Johannesburg, 2193 • Private Bag 3, Wits 2050, South Africa
Tel: +27 11 717-3221 • Fax: +27 11 717-3009 • E-mail: enquiries@educ.wits.ac.za • Website: www.wits.ac.za

23 August 2018

Student Number: 2018ECE005D

Protocol Number: 582086

Dear Naomi Sumangala Alphonsus

Application for Ethics Clearance: Doctor of Philosophy

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:

The Organising Framework of Occupations: The elusive quest to connect education and work

The committee recently met and I am pleased to inform you that **clearance was granted.** 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,

M Mabetha

Wits School of Education
011 717-3416

cc Supervisor – Prof Stephanie Allais and Prof Yael Shalem

Appendix 2: Interview Questions

Interview with QCTO Policy Maker

1. Please describe your role in the development of occupational qualifications?
2. How does the QCTO choose occupations to develop qualification? What kind of evidence does the proposing organisation have to provide?
3. How are the stakeholders chosen for the occupational qualification development process?
4. Please can you explain how the previous qualifications' design for this occupation are used for the design of the new occupational qualification?
5. Please can you explain how the previous qualifications' curriculum design for this occupation are used for the design of the curriculum of the new occupational qualification?
6. Please can you describe the process of developing occupational qualifications? Please can you refer to how this process was designed and how the process is validated at each step for completion and quality of the materials produced?
7. Why has the QCTO chosen the OFO based occupational definitions for the development of occupational qualifications?
8. How does the QCTO use the OFO based occupational definitions in the qualification development process?

   8.1. Please explain the logic of the structure of the occupations and groups of occupations found in the OFO. (Principles the framework is designed on).

      8.1.1. How does it define an occupation for the purposes of the occupational definition?

      8.1. What role does the OFO definition plays in developing the occupational qualification?

      8.2. What is the benefit or challenge of using the OFO definitions in creating the occupational qualification?
9. How do the stakeholders use the OFO in the process of occupational qualification development? Is it close to the anticipated use of the OFO by the QCTO?
10. What challenges has the QCTO experienced in the development of occupational qualifications?
11. What successes has the QCTO experienced in the development of occupational qualification?

12. Last year, the QCTO engaged with another stakeholder NPO to assist in developing the curriculum for the occupational qualifications, why was it necessary to engage with NPO?
    12.1. What kind of contribution does NPO make towards the occupational qualification and curriculum design process?
13. Please can you specify any other stakeholders that are involved in the curriculum development for occupational qualifications? Please can you elaborate who they are and what they do?
14. A key intention/claim of OFO is that it functions as a common language to connect work and training, what specifically about the language of the OFO creates this connection between work and training/educators and employers?

Interview with Policymakers involved in occupational qualifications

1. Please explain your role in relation to the OFO?
2. Why was the OFO introduced in South Africa? What problem was it intended to solve?
3. Was there a framework that the OFO replaced?
4. In your opinion, has the OFO solved the problem you have mentioned?
    4.1 In what ways has it solved the problem?
5. How has the OFO been used? Were there any unexpected uses?
6. Please can you explain the internal logic of the OFO (principles the framework is designed on)?
    6.1. How are OFO definitions created?
    6.2. How are the occupational groups developed?
    6.3. Do these occupational groups reflect the groups found in the South African economy/workplace?
7. How has the OFO been received by stakeholders in South Africa? Please provide examples.
8. The OFO was officially introduced in 2012 and then updated in 2017; please can you provide a reflection on the implementation of the OFO? If possible, please can you provide examples of successes and failures?
9. The use of the OFO in occupational qualification development is central to my research project, please can you explain the how the OFO is used in the development of occupational qualification?
10. How is the OFO used in the development of curriculum for the occupational qualification?

11. Do you believe that the OFO is the right tool for development of occupational qualification? If Yes or No, please elaborate.
12. Do you believe the OFO is the right tool for the development of curriculum for the occupational qualification?
13. Please can you describe DOL/DHET's role in the process of developing the occupational qualification?
14. Please can you describe DOL/DHET's role in the process of developing the curriculum for the occupational qualification?
15. Do you feel the development of occupational qualifications and associated curriculum has been a success or failure? (For either answer ask why?)
16. A key intention/claim of OFO is that it functions as a common language to connect work and training, what specifically about the language of the OFO creates this connection between work and training/educators and employers?

Interview with Facilitator

QCTO Facilitator questions:

1. Please describe your role in the development of occupational qualification?
2. Please explain why you were uniquely qualified for this role?
3. Please describe the process of developing the occupational qualification? /Please describe the various milestones in the development of occupational qualification?
4. Please describe the process of developing the design for the curriculum from the new occupational qualification? /Please describe the various milestones in the development of curriculum for the new occupational qualification?
5. Please describe how you use previously developed qualifications for this occupation to develop the occupational qualification?
6. Please describe how you use the design of the previously created curriculum for this occupation to develop the design of the curriculum for the occupational qualification?

   Did you use the OFO based occupational definition in the development process for the occupational qualification and curriculum?

   6.1 If YES answer the following questions:

   6.1.1. Please explain the logic of the structure of the occupations and groups of occupations found in the OFO. (Principles the framework is designed on).

   6.1.1.1. How does it define an occupation for the purposes of an occupational definition?

6.1.2. How did you use the occupational definition in the occupational qualification development process when you facilitated a session?

6.1.3. What role do you feel the occupational definition plays in developing the occupational qualification?

6.1.4. What role do you the occupational definition plays in developing the curriculum for this occupational qualification?

6.1.5. What is the benefit or challenge of using the occupational definition in the development of the occupational qualification?

6.1.6. What is the benefit or challenge of using the occupational definition in curriculum development for an occupational qualification?

6.2. If NO answer the following question:

6.2.1. Why did you not use the occupational definition in the development of the occupational qualification and curriculum design?

7. Please explain your role as facilitator in the occupational qualification and curriculum design for this trade?

7.1. How were contributions to the process managed? Did you meet the group?

7.2. What was your most valuable contribution to the process?

7.3. From participating in this process, what was the contribution of the members of the group to the process?

7.4. If there was conflict, what particular issues were sources of conflict? How were these issues resolved?

7.5. What were topics in this process that were often agreed upon quickly? Do any stand out?

7.6. What is your opinion on the finished qualification and curriculum; does it adequately meet the demands to practice in this trade?

8. Please can you describe any documents or training that you received to assist your role as facilitator to produce the desired occupational qualification and design of the curriculum?
9. What challenges have you experienced in the process of developing an occupational qualification?
10. What successes have you experienced in the process of developing occupational qualifications?

11. What challenges have you experienced in the process of developing curriculum for the occupational qualification?
12. What successes have you experienced in the process of developing curriculum for the occupational curriculum?

NPO Facilitator questions:

1. Please describe your role in the development of occupational qualification?
    1.1. Please explain why you were uniquely qualified for this role
2. From your perspective, please can you explain the aim of NPO led curriculum development process for occupational qualifications? Why was it necessary to go beyond the curriculum design that was produced in the QCTO led process?
3. Please describe the process of curriculum development from the new occupational qualification? /Please describe the various milestones in the development of curriculum?
4. Please describe how you use previously developed curriculum for this occupation to develop the new occupational curriculum?
5. Did you use the OFO based occupational definition in the development process for the occupational qualification and curriculum?

    5.1 If YES answer the following questions:

        5.1.1. Please explain the logic of the structure of the occupations and groups of occupations found in the OFO. (Principles the framework is designed on).

            5.1.1.1. How does it define an occupation for the purposes of an occupational definition?

        5.1.2. How did you use the occupational definition in the process of developing curriculum for the occupational qualification when you facilitated a session?

        5.1.3. What role do you feel the occupational definition plays in developing the curriculum for this occupational qualification?

        5.1.4. What is the benefit or challenge of using the occupational definition in occupational qualification creation?

        5.1.5. What is the benefit or challenge of using the occupational definition in curriculum development for occupational qualification?

    5.2. If NO answer the following question:

        5.2.1Why did you not use the occupational definition in the curriculum development process for the occupational qualification?

6. Please explain your role as facilitator in the curriculum development for the new occupational qualification for this trade?
    6.1. How were contributions to the process managed? Did you meet the group?
    6.2. What was your most valuable contribution to the process?
    6.3. From participating in this process, what was the contribution of the members of the group to the process?
    6.4. If there was conflict, what particular issues were sources of conflict? How were these issues resolved?
    6.5. What were topics in this process that were often agreed upon quickly? Do any stand out?
    6.6. What is your opinion on the finished qualification and curriculum; does it adequately meet the demands to practice in this trade?
7. Please can you describe any documents or training that you received to assist your role as facilitator to produce the desired occupational qualification and design of the curriculum?
8. What challenges have you experienced in the process of developing curriculum for the occupational qualification?
9. What successes have you experienced in the process of developing curriculum for the occupational curriculum?

Interview with Expert Practitioners

1. Please can you describe how you were involved in the development of this occupational qualification? Or in what capacity you were involved?
2. How long have you been teaching in this field?
3. Please describe the process of developing the occupational qualification? / Please describe the various milestones in process of developing of the occupational qualification?
4. Please describe the process of developing the curriculum for the occupational qualification? / Please describe the various milestones in the process of developing curriculum for the qualification occupational?
5. As you were involved in both the QCTO and NPO processes of the development of the occupational qualification and associated curriculum for this trade, please can you describe any differences or similarities that stand out in the two processes?
6. Please explain your involvement in the occupational qualification and curriculum for this trade?

6.1. How was the occupational definition used in the process of developing the qualification and curriculum for this trade?

6.2. How was the occupational definition used in the process of developing the curriculum for the occupational qualification?

6.3. How were contributions to the process managed? Did you meet the group?

6.4. What was your most valuable contribution to the process?

6.5. From participating in this process, what was the contribution of the members of the group to the process?

6.6. If there was conflict, what particular issues were sources of conflict? How were these issues resolved?

6.7. What were topics in this process that were often agreed upon quickly? Do any stand out?

6.8. What is your opinion on the finished qualification and curriculum; does it adequately meet the demands to practice in this trade?

6.9 What challenges have you experienced in the process of developing an occupational qualification?

6.10. What challenges have you experienced in the process of developing curriculum for the occupational qualification?

6.11. What successes have you experienced in the process of developing occupational qualifications?

6.12. What successes have you experienced in the process of developing curriculum for the occupational curriculum?

7. Are you currently using the contents of the new occupational curriculum that you were part of developing?

    7.1. If no, what curriculum are you currently using?

        7.1.1. How does the current curriculum differ from the new occupational curriculum?

        7.1.2. In your opinion, does the current curriculum provide access to acquiring important foundations of knowledge to practice in this occupation today?

    7.2. If yes, how does this new occupational curriculum differ from the one you used before?

8. What do you think are the important foundations of knowledge to practice in this occupation?

9. Please describe any key elements of the trade that are or are not explicit in the new occupational curriculum?
10. What are the basic requirements for passing the theoretical component of this trade?

Appendix 3: Document Analysis

1. Skills Development Act, 1998, 97 of 1998, 19420 (2010). https://www.gov.za/documents/skills-development-act
2. Institute of Plumbing of South Africa (IOPSA). (2018). *Occupational Certificate: Plumber*. Quality Council for Trades and Occupations. https://www.qcto.org.za/index.php/plumber
3. Local Government Sector Education and Training Authority. (n.d.). *Curriculum Document: Occupational Certificate: Qualification: Electrician*. Retrieved 26 September 2019, from http://www.qcto.org.za/index.php/electrician.html
4. National Qualifications Act, 2008 [Act No. 67 of 2008]: Occupational Qualifications Sub-Framework [OQSF] Policy, Notice 597 OF 2014, 37879 (2014). http://www.fpmseta.org.za/downloads/QCTO_OQSF_Policy_Version_25_02_2013.pdf
5. National Qualifications Act, 2008 [Act No. 67 of 2008]: Revised occupational qualifications sub-framework, Notice 239 of 2014, 43062 34 (2020). https://www.gov.za/sites/default/files/gcis_document/202003/43062gon239.pdf
6. Quality Council for Trades and Occupations, & GIZ on behalf of the German Government. (2013). *DQP and Potential DQP Process Manual August 2013*. Quality Council for Trades and Occupations. http://www.qcto.org.za/images/procedures/dqp_guide_-_dqp_and_potential_dqp_process_manual.pdf
7. Quality Council for Trades and Occupations, & GIZ on behalf of the German Government. (2014). *Occupational Qualifications Development Facilitator Manual*. Quality Council for Trades and Occupations. https://www.fpmseta.org.za/downloads/QDF_Manual.pdf
8. Draft Electrician NOCC overview document (via email)

9. Draft Electrician NOCC module documents (via email)

10. Draft Plumber NOCC overview document (via email)

11. Draft Plumber NOCC module documents (via email)

Appendix 4: Participant Consent Form: Interview

Protocol Number: 2018ECE005D

Please fill in and return the reply slip below indicating your willingness to be interviewed for my research project: The Organising Framework of Occupations: The elusive quest to connect education and work.

I, _____

Give/ do not give (please delete as appropriate) my consent to be interviewed.

[ ] I understand the purpose and contents of the research proposed that I am being interviewed for.

[ ] I know that I don't have to answer all the questions.

[ ] I may withdraw from the study at any time and I will not be advantaged or disadvantaged in any way.

[ ] I am aware that the researcher will not use my name in the research, however she will use the name of my organisation. Therefore, the researcher cannot guarantee anonymity and confidentiality.

[ ] I am aware that my interview transcript will be destroyed after use.

[ ] I agree to be audiotaped during the interview.

[ ] I know that the audiotapes will be used for this project only.

[ ] I understand the that the interview will be 60 minutes.

Signature: _____

Date: _____

Phone number: _____

Contact person:

Name: Naomi Sumangala Alphonsus

Address:

Tel number: