Mapping links between occupations and Classification of Educational Subject Matter (CESM)

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LIST OF ABBREVIATIONS AND ACRONYMS

CESM	Classification of Educational Subject Matter
CPD	continuous professional development
DHET	Department of Higher Education and Training
DoE	Department of Education
DoL	Department of Labour
DOL-ETA	Department of Labor, Employment and Training Administration
dti	Department of Trade and Industry
EC	European Commission
ECSA	Engineering Council of South Africa
ESCO	European Skills, Competences, Qualifications and Occupations
ETQA	Education and Training Quality Assurance
FET	further education and training
GIZ	German Federal Enterprise for International Cooperation
HEMIS	Higher Education Management Information System
HSRC	Human Sciences Research Council
ILO	International Labour Organization
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
LMIP	Labour Market Intelligence Partnership
MTA	Manpower Training Act
NATED	National Technical Education
NCAP	National Career Advisory Programme
NOPF	National Occupational Pathways Framework
NQF	National Qualifications Framework
OFO	Organising Framework for Occupations
QCTO	Quality Council for Trades and Occupations
SABPP	South African Board for People Practices
SAQA	South African Qualifications Authority
SDA	Skills Development Act
SETA	Sector Education and Training Authority
SIC	Standard Industrial Classification
SIP	Strategic Integrated Projects
SOC	Standard Occupational Classification
SSB	Standard Setting Body
UK	United Kingdom
US	United States

INTRODUCTION

Internationally, there is substantial interest in mapping qualifications to occupations, or, alternatively, mapping occupations to qualifications. The appeal of these mapping exercises lies in generating better matching between the supply of skills by education and training institutions and the demand for skills expressed in the labour market.

For example, there may be one or perhaps more study pathways that qualify a person to practise in a specific occupation. If such study pathways – or career pathways in the long term – are mapped systematically for all occupations in a national labour market, the outcome would be a database that can be made freely accessible on the internet to facilitate study and occupational choices made by work-seekers. Alternatively, mapping links between occupational classification and qualifications classification systems may be done to generate occupational profiles showing which competences and qualifications are relevant for an occupation that could be negotiated between employers and educators. This can contribute to better labour market intermediation through helping work-seekers find the right job more easily and so limit mismatches between job demand and supply. On a smaller scale, by focusing on strategic occupations, employers and educational institutions can apply mapping techniques to optimise the match between skills demand in the workplace and the curriculum of the educational institutions. These examples reflect the value that mapping between occupations and qualifications can bring through more effective labour market intermediation and, as importantly, through generating data to support skills planning.

Consequently, this working paper was conceived to explore initiatives in mapping in South Africa, giving particular attention to the Classification of Educational Subject Matter (CESM) and to the

Organising Framework for Occupations (OFO), because these two classification systems are the current national standards. The brief of the working paper was therefore to interrogate the CESM and OFO systems, which define the worlds of study and work respectively, locating them in the context of the evolving policy discourse and contending conceptions of how to capture the education–work nexus in the later period of the National Qualifications Framework (NQF).[1] In so doing, the working paper identifies features of these systems that will impact on the feasibility of further mapping initiatives. Based on this platform, the paper puts forward a set of conclusions and recommendations.

Though mapping of links between occupations and qualifications in this working paper is concentrated on the links between two classification systems, mapping can be undertaken in a wide variety of ways, depending mainly on the key resources available: the quality of data, information technology, taxonomies available to be mapped with each other, and human resources to integrate the systems. In resource-rich environments, early initiatives were, for instance, the 2002 Labor Exchange Skills Project of the United States (US) Department of Labor, Employment and Training Administration (DOL-ETA) which created 'taxonomic linkages to jobs, resumés, and courses' and provided 'a common linking language for the supply and demand side of labor exchange to facilitate effective communication … for the development of a skilled workforce'.[2]

In the United Kingdom (UK), in response to employer skills needs, the Learning and Skills Council of the North East region developed 'an approach to

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1   Research for this working paper included a series of interviews with key staff of the DHET, further education, NCAP (National Career Advisory Programme) and SIP (Strategic Integrated Projects) divisions.
2   http://www.xwalkcenter.org/les1/execsummary.pdf.

mapping qualifications to occupations and industrial sectors' which subsequently 'informed the development of a national strategy for sector data'. What this meant was utilising Sector Skills Council and Standard Setting Body (SSB) datasets against which qualifications were mapped which informed development of sector qualification strategies and action plans.[3] This is an instance of mapping undertaken at a sector rather than a geographic level, the latter being more common, though mapping at the sector level will only work well if limited to jobs found only in a particular sector.

More recently, in 2013 the European Commission (EC) launched ESCO, a multilingual classification of European Skills, Competences, Qualifications and Occupations (ESCO) which:

identifies and categorises skills and competences, qualifications and occupations relevant for the EU labour market and education and training, in 22 European languages. The system provides occupational profiles showing the relationships between occupations, skills, competences and qualifications.

The EC created ESCO to:

bridge the gap between the world of education and training and the labour market. By introducing a standard terminology for occupations, skills, competences and qualifications ESCO can help education and training systems and the labour market to better identify and manage availability of required skills, competences and qualifications.[4]

This massive regional intervention provides a perspective on how mapping linkages between not two but several occupations and qualifications systems can allow users to select which classification system they wish to use.

The NQF and demand and supply approaches

In South Africa, mapping the CESM to the OFO represents an attempt to heal a schism that has deeply divided the NQF since its inception. The National Qualifications Framework Act reads as follows:

Objectives of NQF

5 (1) The objectives of the NQF are to:
(a) create a single integrated national framework for learning achievements;
(b) facilitate access to, and mobility and progression within, education, training and career paths;
(c) enhance the quality of education and training;
(d) accelerate the redress of past unfair discrimination in education, training and employment opportunities.

(2) The objectives of the NQF are designed to contribute to the full personal development of each learner and the social and economic development of the nation at large.

(3) SAQA and the QCs must seek to achieve the objectives by:
(a) developing, fostering and maintaining an integrated and transparent national framework for the recognition of learning achievements; …

(From the National Qualifications Framework Act 67 of 1998.)

The use of phrases such as 'career paths', 'employment opportunities' and "social and economic development' was clearly aimed at an approach which, if it could not integrate education and labour market interests, could at least create some articulation between these interests.

This has, however, proved difficult for a number of reasons. One of the major reasons has been the lack of an entrenched skills development discourse. The education system has primarily been a supply-driven system that produces students without giving much

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3   http://readingroom.lsc.gov.uk/lsc/NorthEast/ner-strategicanalysis2008.pdf.
4   http://ec.europa.eu/social/main.jsp?catId=1042&langId=en.

consideration to the demand for qualified people in particular fields of study or what the actual needs in the labour market are. Similarly, the labour market actors find it difficult to articulate their requirements in educational terms.

However, with the processes that led up to the formation of the Quality Council for Trades and Occupations (QCTO), the revised NQF-related legislation in 2008 and subsequent work, much has been done to establish a demand-side system to enable us to better understand the needs in respect of 'career paths', 'employment opportunities' and 'social and economic development'.

This working paper is intended to discuss the feasibility of mapping. Fortunately, there has already been an attempt at mapping of the CESM to the OFO as part of the continuing development of the OFO in OFO version 13 (DHET 2013) and the development of occupational qualifications under the QCTO that are linked to the OFO. However, prior to describing the outcomes of this mapping process, it is necessary to describe some of the history that has led up to this point.

WHAT IS THE CESM?

The CESM is a tool used by the DHET to collect information about:

- Qualifications and fields of study;
- The courses (or modules) offered within academic programmes;
- The courses for which each student is registered; and
- The fields in which academic/research staff members are active.

(Adapted from CESM 2009:1.)

The underlying logic relates to 'fields of study' and 'courses'. By linking university offerings to these codes, universities can submit data to the DHET's Higher Education Management Information System (HEMIS) in a standardised way, allowing the collection of information which is broadly comparable.

The CESM classifies the subject matter into three orders or levels of detail:

Table 1. CESM Subejct matter

Order	No. of fields
First order	20
Second order	239
Third order	1 006

Adapted from DHET (2008)

The CESM provides the following example of hierarchical ordering in the table at the foot of this page. The second and third orders have been offset to the right to show the dependency.

The current version of the CESM is an update of a version developed by the then Department of Education in 1982. It was originally based on a 1997 report published by the National Center for Education Statistics in the US.

CESM limitations

There are a number of limitations to extending the use of the CESM. If we consider the case of mapping subjects to occupations, the CESM:

1. Only reflects fields of study and courses. It does not reflect qualifications. While a mapping of courses to occupations would be useful, it cannot be done on a one-to-one basis. A qualification will generally contain several courses or perhaps even subjects from different fields of study.
2. Has been designed for higher education. This would limit its usefulness for occupations at OFO skill levels 1 and 2 (see below p.7) or NQF levels 1–4.

Table 2. Example of hierarchical ordering

Order or level	Code number	Description	
First order	01	Agriculture, agricultural operations and related sciences	
Second order	0103		Agricultural production operations
	0104		Applied horticulture and horticultural business services
Third order	010302			Aquaculture
	010303			Crop production
	010403			Greenhouse operations and management
	010404			Landscaping and grounds keeping

Adapted from ILO (2006)

3. Does not reflect institutional structures, that is, faculties, departments, etc., and therefore also not institutional strategies, linkages to economic sectors, or occupational or professional bodies.
4. Does not specify the level of content or attainment of institutional offerings, subject titles, etc.

It is worth reiterating that the real purpose of the CESM is to standardise the 'reporting and comparing of subject matter, both within institutions and communications with a national Department of Education' (Department of Education 2008).

Currently, only the South African public university sector makes extensive use of CESMs, which means that the recommendations of this report are relevant only to qualifications offered by public universities. However, the scope of the LMIP and skills planning activities of the DHET encompass all post school education and training sectors.

Classification systems used in further education and training (FET)

There is no formal classification system used in the development of vocationally directed education and training. The subjects used in Reports 190 and 191 (the so-called N- or NATED subjects used by technical colleges in the past for vocational education) do not seem to be guided by any classification system. If there was such a system, the institutional memory of it has long since disappeared, according to Aruna Singh of the DHET FET Directorate.

When developing the National Certificate (Vocational), the Directorate in the Department of Education endeavoured to align the general subjects and curricula to the CESM. The vocationally directed subjects, however, could not use the same logic.

Both Aruna Singh and Gerda Magnus of the FET Directorate indicated that they also saw the need for a similar kind of mapping process between FET offerings and occupations, that is, the occupations that would not be addressed through a CESM mapping. The problem was articulated as: How do we develop programmes when we receive specific requests from industry for certain types of training?

The use of the word 'programmes' also provides a clue as to how the mapping process may have to be structured – see the conclusions and recommendations on page 22 hereof.

WHAT IS THE OFO?

The OFO is a skills-based, coded classification system used by the DHET to collect information about skills demand and supply. It is used by employers to report in their annual workplace skills plans. Sector Education and Training Authorities (SETAs), in turn, aggregate and analyse this data in order to draw up sector skills plans. The data in these plans are then used to aggregate and analyse national needs in, for instance, the National Scarce Skills List[5], which is/was used for a variety of purposes, for example the issuing of immigration permits for scarce and critical skills by the Department of Home Affairs.

The history and evolution of the OFO are not really pertinent to this working paper, except to say that the OFO is aligned to the 2008 version of the International Standard Classification of Occupations (ISCO) 08 compiled by the International Labour Organization (ILO), an organ of the United Nations.

Simply speaking, ISCO-aligned classification systems are built from the bottom up, starting with jobs, clustering these into occupations, clustering similar occupations into groups, and continuing the process until one arrives at the eight major groups.

The OFO – underpinning concepts

The ISCO uses the following underlying concepts to structure the classification system (see annex 1 of the ISCO 08). The following is extracted from the annex:

Underlying concepts

5. The framework used for the design and construction of ISCO-08 is based on two main concepts: the concept of the kind of work performed or job, and the concept of *skill*.

Definitions of job and occupation

6. A *job* is defined in ISCO-08 as a 'set of tasks and duties carried out, or meant to be carried out, by one person for a particular employer, including self employment'.

7. An *occupation* is defined as a set of jobs whose main tasks and duties are characterised by a high degree of similarity. A person may be associated with an occupation through the main job currently held, a second job or a job previously held.

Skill

8. *Skill* is defined as the ability to carry out the tasks and duties of a given job. For the purposes of ISCO-88, two dimensions of skill are used to arrange occupations into groups. These are skill level and skill specialisation.

Skill level

9. *Skill level* is defined as a function of the complexity and range of tasks and duties to be performed in an occupation. Skill level is measured operationally by considering one or more of:

- the nature of the work performed in an occupation in relation to the characteristic tasks and duties defined for each ISCO-88 skill level;

- the level of formal education defined in terms of the International Standard Classification of Education (ISCED-97) required for competent performance of the tasks and duties involved; and

- the amount of informal on-the-job training and/or previous experience in a related occupation required for competent performance of these tasks and duties.

Skill specialisation

10. The concept of skill level is applied mainly at the top (major group) level of the classification. This means that eight of the ten major groups in ISCO-08 contain occupations only at one of four skill levels. For example, ISCO Major Group 2, Professionals, only includes occupations at the highest ISCO skill level, Skill Level 4.

11. Skill specialisation is considered in terms of four conceptual concepts:

- the field of knowledge required;

- the tools and machinery used;

- the materials worked on or with; and

- goods and services produced.

12. Within each major group occupations are arranged into unit groups, minor groups and sub-major groups, primarily on the basis of aspects of skill specialisation. (ILO 2006)

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5   It would seem that, currently, this list is no longer being compiled. The Department of Labour used to compile this list, but, when the DHET was formed and it took over the skills branch of the DoL, this process seemed to have fallen between two stools (Radebe 2013).

See also the Skills Demand List 2012–2013, http://www.dhet.gov.za/LinkClick.aspx?fileticket=akZ2tL6YU7k=&tabid=346&mid=1415.

Conceptually, the OFO looks as follows:

Figure 1: A representation of the OFO
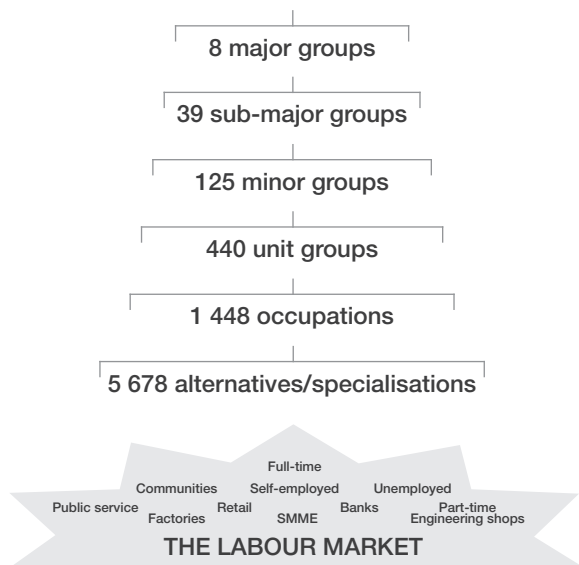
Adapted from author slides

In practice, the ISCO and the various national versions that are spawned by it only use the highest levels of the hierarchy for the gathering of statistics. The OFO differs in this respect in that it works primarily at the level of occupation and occupational specialisations.

As noted above, skill levels are used as one dimension to group occupations. Table 3 shows how skill levels have been used in the OFO.

Table 3: Use of skill levels in the OFO

OFO Major groups	Level
Managers	3 + 4
Professionals	4
Technicians and Associate Professionals	3
Service and Sales Workers	2
Clerical Support Workers	2
Skilled Agricultural Forestry, Fishery, Craft and Related Trades Workers	2
Plant and Machine Operators, and Assemblers	2
Elementary Occupations	1

Adapted from ILO (2006)

The ISCO also mapped skill levels to the International Standard Classification of Education 97 (ISCED), as illustrated in Table 4:

Table 4: Mapping of the four ISCO 08 skill levels to ISCED 97 levels of education

ISCO 88 Skill level	ISCED 97 groups
4	6 - Second stage of tertiary education (leading to an advanced research qualification)
	5a - First stage of tertiary education, first degree (medium duration)
3	5b - First stage of tertiary education (short or medium duration)
	4 - Post-secondary, non-tertiary education
2	3 - Upper secondary level of education
	2 - Lower secondary level of education
1	1 - Primary level of education

Adapted from ILO (2006)

The following demonstrates how the OFO is structured, using the occupation of 'Occupational Instructor/Trainer' as an example:

Table 5: Example of how the OFO is structured

Code	Occupational group	Level
2	Professionals	Major group
24	Business and Administration Professionals	Sub-major group
242	Administration Professionals	Minor group
2424	Training and Staff Development Professionals	Unit group
242402	Occupational Instructor/ Trainer	Occupation
	Business Skills Business Leadership/Executive Coach Maintenance Instructor Police Instructor Welding Instructor	Alternative titles and specialisations

DHET (2013)

For each unit group, the OFO provides a descriptor and an indicative set of tasks for all the occupations in the group, as illustrated in this extract from the OFO 2013:

2424 Training and Staff Development Professionals
Training and staff development professionals plan, develop, implement and evaluate training and development programs to ensure management and staff acquire the skills and devlop the competencies required by organizations to meet organizational objectives.

Tasks include:

Desiging, coordinating, scheduling and conducting training and development programs

that can be delivered in the form of individual and group instruction, and facilitating workshops, meetings, demonstrations and conferences.

Gathering, investigating and researching background materials to gain an understanding of various subject matters and systems.

Identifying training needs and requirements of individuals and organizations.

Liaising with external training providers to arrange delivery of specific training and development programs.

Monitoring and performing ongoing evaluation and assessment of internal and external training quality and effectiveness, and reviewing and modifying training objectives, methods and course deliverables.

Preparing and developing instructional training materials and aids such as handbooks, visual aids, online tutorials, demonstration models, and supporting training reference documentation.

Promoting internal and external training and development, and evaluating these promotional activities.

For minor, sub-major and major groups, the descriptors and indicative tasks become broader and broader, summarising the groups in the level below and generalising them.

But, at the level of the occupation, the OFO does not describe tasks but only provides a descriptor and then a list of alternative titles and specialisations. The latter enables users to identify the occupation if the job titles they use are different from what is generally used or if there is no general title for the occupation. In some cases, this is only an issue of usage, but in others it may indicate an area of occupational specialisation.

Not all occupations can be clustered into groups. Where the OFO uses a figure 9[6], this indicates an

occupation, or group of occupations, not classified elsewhere. The following illustrates this principle:

1349	*Professional Services Managers not Elsewhere Classified*
134901	*Environmental Manager*
134902	*Laboratory Manager*
134903	*Small Business Manager*
134904	*Office Manager*
134905	*Judicial Court Manager*
134906	*Practice Manager*
134907	*Archives Manager*
134908	*Library Manager*
134909	*Museum Manager*
134911	*Insurance Policy Administration Manager*
134912	*Commissioned Fire and Rescue Officer*
134913	*Commissioned Police Officer*
134914	*Correctional Services Manager*
134915	*Operations Manager (Non Manufacturing)*
134916	*Operations Foreman (Non Manufacturing)*
134917	*Publisher*

The OFO notes the following in relation to this unit group:

This unit group covers managers who plan, direct, coordinate and evaluate the provision of specialised professional and technical services and are not classified in sub-major group 12, business services and administration managers, or elsewhere in sub-major group 13, professional services managers. For instance, managers responsible for the provision of policing, corrective, library, legal and fire services are classified here.

NOTE: Specialised qualifications and extensive experience relevant to occupations classified in Major group 2, Professionals, or Major group 3, Technicians and Associate Professionals, are usually required.

It would be very difficult to map this unit group to the CESM, given the diversity of occupations in this group.

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6   The CESM uses the same convention, e.g. 150299 Applied Mathematics, Other.

THE HISTORICAL CONTEXT OF MAPPING LINKS BETWEEN EDUCATION AND THE WORLD OF WORK

Mapping the CESM to the OFO

The two classification systems, the CESM and the OFO, define two different worlds:

- That of study; and
- That of work.

The establishment of the NQF was meant to integrate these two worlds. A scan of the policy debates, the Study Team Review of the NQF, the Consultative Document of 2003 and, finally, the Joint Policy Statement of 2007 provides evidence of how difficult it was to achieve agreement on these issues.

But it was not until the OFO was developed and entrenched within the DoL and SETA systems that occupational qualifications became recognised as a distinct entity. However, the emergence of the OFO as an organising principle took some time to be conceptualised and implemented. The journey to that point is instructive for any proposals related to mapping the CESM and the OFO.

Domination of the educational discourse in the early years of the NQF

The NQF objectives, as outlined above, were hampered from the outset by the enclosing of the framework within an education framework. The Education and Training Bands imposed on the eight, and later ten, levels of the NQF, mirror institutional structures in the world of education. Professional, artisan and other qualifications, for example pilot, accountant or draftsman only existed on the periphery. In fact, designated trades were only 'recorded' but were never registered on the NQF, and professional qualifications, especially those that linked to designations, had no place on the NQF. Similarly, quality assurance was governed through

Education and Training Quality Assurance bodies (ETQAs). There were two primary ETQAs: one for the general and further education band and one for the higher education band. The concept of training was far weaker and less explored and, while elsewhere the term 'education, training and development' was used, the concept 'development' in support of learning was not explored.

It was only the passage of the Skills Development Act that allowed the injection of the SETA quality assurance bodies into the NQF. In addition, there were some far-sighted professional bodies such as the South African Board for People Practices (SABPP) which managed to claim a space on the NQF.

With the registration of occupationally led unit standards-based qualifications and the introduction of SETA ETQAs, one would have expected a more coherent and structured approach to such qualifications to emerge.

But the discourses around the NQF, initially free and flexible, hardened considerably and the education world view became embedded in qualification and quality assurance practices. To a large extent, this world view still dominates. Whereas much of the early focus of the NQF was on workplace learning, the NQF institutions, structures, practices and arrangements pushed workplace learning to the periphery, or even dismissed it entirely. There were no real attempts to get to grips with assuring the quality of workplace learning. Accreditation and registration requirements were phrased in a way that made it difficult for workplaces to be sites of training. In fact, in some industries such as clothing, footwear and leather, in-house training providers were forced to spend large sums of money to register as FET colleges in order to meet inappropriate, educationally driven requirements. The NQF was very quickly

conceptualised around the principle of provision for which the workplace typically does not provide: it requires learner engagement in work processes, where learning is a by-product of the production or service process. Teaching in the workplace is done most often in a very different way from that used in formalised training, primarily by using the apprenticeship paradigm: role-modelling, supporting and fading, then subsequently using stories to illustrate approaches, attitudes and values in relation to real-life incidents and events.

There has been an ongoing struggle from the side of the world of work to try to influence the NQF, beginning with the Skills Development Act of 1998, through the implementation of learnerships and the various attempts to revise NQF structures between 2002 and 2008, and culminating in the new and revised legislation in 2008.

The so-called turf war between the education and labour departments was not about turf but about the battle for the recognition of another type of learning, one where learning happened in the context of work.

But mapping the CESM and the OFO is, perhaps, a first step towards engaging with the question of how people traverse learning pathways across institutional and organisational boundaries, and vice versa.

Organising fields

One component of the NQF structure that opened up some space for enabling a convergence between the world of education and the world of work were the organising fields.

(4) The National Qualifications Framework shall be divided into twelve organising fields, which shall be:

Field 01: Agriculture and Nature Conservation
Field 02: Culture and Arts
Field 03: Business, Commerce and Management Studies
Field 04: Communication Studies and Language
Field 05: Education, Training and Development

Field 06: Manufacturing, Engineering and Technology
Field 07: Human and Social Studies
Field 08: Law, Military Science and Security
Field 09: Health Sciences and Social Services
Field 10: Physical, Mathematical, Computer and Life Sciences
Field 11: Services
Field 12: Physical Planning and Construction

(SA 1998: 6f)

The organising fields were then broken into subfields for the purposes of registering qualifications and managing the development of qualifications, for example 01 Agriculture and Nature Conservation:

- *Primary Agriculture*
- *Secondary Agriculture*
- *Nature Conservation*
- *Forestry and Wood Technology*
- *Horticulture…*

(Pasted from http://www.saqa.org.za/show.asp?include=structure/nsb/nsb1/subfields.htm.)

Each subfield was further delineated by adding a scope of coverage, for example the coverage of the five subfields of Organising Field 01 was as follows:

SUB-FIELD
SCOPE OF COVERAGE

1. Primary Agriculture

- *Farming*
- *Farming support systems*
- *Animal health*
- *Regulatory services*
- *Agricultural education*
- *Agricultural extension*

2. Secondary Agriculture…

(Pasted from http://www.saqa.org.za/show.asp?include=structure/nsb/nsb1/subfields.htm.)

The hybrid nature of the scope of coverage was amply demonstrated in Organising Field 06: Manufacturing, Engineering and Technology, where the Standard Industrial Classification (SIC) codes were used for the scope of coverage. These are codes

Table 6: Linkages between the CESM, OFO and SIC codes

CESM	OFO		SIC	
140406 Polymer Chemistry	211403	Materials Scientist	3343	Mfg of plastics in primary form and of synthetic rubber
		Specialisation: Polymer Scientist		
	311702	Metallurgical or Materials Technician	33430	Rubber substitute manufacturing
			33430	Urea resin manufacturing
			33430	Soybean plastic manufacturing[7]

Author

used by the Department of Trade and Industry (dti) which codify economic activities.[7] The scope of SETAs is determined by the SIC codes. The relationship between the SIC codes and the OFO is tenuous, as would be the relationship between the SIC codes and the CESM. In general, the SIC codes signal the context or application of the subject matter and the occupation as illustrated in Table 6.

The South African Qualifications Authority (SAQA) organising fields, subfields and scope of coverage formed a hybrid reflecting both areas of study and areas of social and economic activity. They provided a space to allow the interests of the world-of-work to be reflected: some of the coverage related to human performance rather than knowledge categories, for eample items such as game ranching and professional hunting in Field 01, and from other organising fields, items such as writing and editing, and negotiation skills, were reflected.

Other items suggested that both interests, that is, studies and skills, were reflected, for example project finance, human resources development and agricultural extension. One could thus envisage 'study' standards and 'performance' standards being included in the same organising field.[8]

This promise eventually crumbled as the 'study' focus became more pronounced in the implementation of the NQF. This trend was exacerbated by the naming conventions for qualifications adopted by SAQA. The naming convention focused on the area of study rather than on an occupation.

The following qualifications from the subfield Fabrication and Extraction demonstrate how the education discourse dominated in, for example, Organising Field 06: Manufacturing, Engineering and Technology, where the following qualifications were registered:

Table 7: Organising field 06

Qual. ID	Qualification title	NQF level	Min. credits
22871	National Certificate: Engineering Fabrication (light or heavy)	NQF Level 04	153
22870	National Certificate: Engineering Fabrication (light or heavy)	NQF Level 03	151
22869	National Certificate: Engineering Fabrication	NQF Level 02	159

SAQA

The title of the qualification is specified in terms of a field of study, that is, Engineering Fabrication. The title bears no resemblance to the occupations linked to this field of study. The qualifications are aimed at a number of related occupations (in this case, trade or artisan qualifications) including boilermaker, plater/boilermaker, plumber/sheetmetal worker and sheetmetal worker.

The development of broad qualifications such as the above was an attempt to reduce the number of qualifications to be registered on the NQF. But it distorts the use of such qualifications in the world of work.

The qualification design also creates some difficulties in implementation. Trades are traditionally based on apprenticeships and apprenticeships last from a minimum of two-and-a-half to four years, resulting in a trade qualification. The unit standards-based approach to qualification development split such programmes into artificial divisions which entailed the

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7   The SIC, like the OFO, is a five-level classification system maintained by the Department of International and Social Affairs of the United Nations. The four-digit code represents a group and the six digit code, a subgroup.

8   This particular subgroup consists of 78 different types of polymer, all with the same code of 33430.

completion of three separate qualifications stepping from one NQF level to the next. This also meant the registration of three learnerships. In this case, the same qualification had several more learnerships for the various trades. To have multiple qualifications and learnerships for one occupation was something that the world of work could not understand or deal with, since the lower level qualifications did not easily link to jobs in the industry. Industry typically employed boilermakers and boilermakers' assistants. The latter learned their work primarily through on-the-job learning and informal training.

The notion of occupation as a unit of analysis in the education and training field was not very strong. At best, specific types of occupation such as professions and trades were used.

The Skills Development Act (SDA) of 1998 was designed to promote learning for the workplace. It was intended to replace and extend the provisions of the Manpower Training Act (MTA) of 1981. The MTA had provided the legislative framework for industrial training, including the management of apprenticeship training. The SDA retained the provisions of the MTA for the training of apprentices. SETAs, once established, took over the role of industry training boards in the management of apprenticeship training. The SDA of 1998 reflects the following as its purpose:

> *To provide an institutional framework to devise and implement national, sector and workplace strategies to develop and improve the skills of the South African workforce; to integrate those strategies within the National Qualifications Framework contemplated in the South African Qualifications Authority Act, 1995; to provide for learnerships that lead to recognised occupational qualifications; to provide for the financing of skills development by means of a levy-grant scheme and a National Skills Fund; to provide for and regulate employment services; and to provide for matters connected therewith.* (SA 1998:2)

Of particular note for this discussion is the object 'to provide for learnerships that lead to recognised occupational qualifications'.

The SDA went on to define learnerships and create a linkage to qualifications registered on the NQF:

> *16. Learnerships – A SETA may establish a learnership if –*
>
> *a. the learnership consists of a structured learning component;*
>
> *b. the learnership includes practical work experience of a specified nature and duration;*
>
> *c. the learnership would lead to a qualification registered by the South African Qualifications Authority and related to an occupation.* (SA, 1998:20)

Similarly, skills programmes were also linked to occupations:

20. Skills programmes –

(1) For the purposes of this Chapter, a 'skills programme' means a skills programme that –

a. is occupationally based
(SA 1998:25)

So, based on the engineering fabrication qualifications in the example above, the following learnerships were registered by Manufacturing, Engineering and Related Services SETA (merSETA) for three occupations (in this case, trades):

National Certificate in Engineering Fabrication (Sheetmetal Worker) Level 2

National Certificate in Engineering Fabrication (Vehicle Body Builder) Level 2

National Certificate in Engineering Fabrication (Boilermaker) Level 2

National Certificate in Engineering Fabrication (Light) (Sheetmetal Worker) Level 3

National Certificate in Engineering Fabrication (Light or Heavy) (Vehicle Body Builder) Level 3

National Certificate in Engineering Fabrication (Heavy) (Boilermaker) Level 3

National Certificate in Engineering Fabrication (Light) (Sheetmetal Worker) Level 4

National Certificate in Engineering Fabrication (Light or Heavy) (Vehicle Body Builder) Level 4

National Certificate in Engineering Fabrication (Heavy) (Boilermaker) Level 4

The Act thus brought several words into currency that have affected the discourse around workforce development:

- Skills and skills development;
- Occupations; and
- Learnerships and skills programmes.

Skills development in the Act was seen as a macro-level activity, that is, to provide an institutional framework to devise and implement national, sector and workplace strategies so as to develop and improve the skills of the South African workforce.

But many of the actors in the education and training world chose to see skills development as simply a synonym for training, and training at the lower levels of the NQF at that. Almost overnight, many training companies dropped 'training' from their name and replaced it with 'skills development'.

Nor was the concept of occupations well understood. So, although the Act specified that the learnership should be linked to an occupation, neither the learnership regulations nor the learnership registration form (annexure A of the Regulations Concerning the Registration of Intended Learnerships and Learnership Agreements) contained the word 'occupation' (SA Labour, 2000).

There was also a lack of a uniform nomenclature related to occupations. This led to erroneous data being collected in sector skills plans, etc., and to the duplication of qualifications registered on the NQF, for example a qualification for an Agricultural Machinery Technician was almost identical to a qualification for a Fitter. The work being done was simply in a different context. confusion between occupation and industry context is an inherent problem where SETAs are defined by SIC codes, ie by economic activity. Some occupations are directly linked to economic activity, while others are found across a range of economic activities.

The OFO thus came about as an attempt to address a number of these issues, namely:

- To provide a uniform nomenclature for different types of work;
- To create a clearer link between qualifications and the occupations they were aimed at; and
- To ensure conformance to the legislative requirements spelled out in the SDA.

In contrast to education, with its degrees and diplomas, there is a lack of a distinct qualifications typology.

During 2001, the author was involved in a project which attempted to develop generic manufacturing qualifications. The discussions revolved round having generic operator, setter or supervisor qualifications for a range of manufacturing processes and also qualifications for activities above NQF Level 4. There was considerable confusion as to how the proposed qualifications would link to, or articulate with, higher-education qualifications. Higher education did not directly deal with manufacturing, but rather embedded it in subjects relating to a particular processing methodology, for example food or pulp and paper processing technology.

The mismatch between what the manufacturing industry needed and what graduates had learnt was summarised as follows:

People in the workplace see highly paid (i.e. relative to themselves) graduates enter the workplace, learn from the existing staff and quickly move up the organisational hierarchy. At the same time, vocational or organisation-specific qualifications have little credence when people in the workplace seek entry to institutions of higher learning. The greatest barriers are the lack of exposure to formal science and maths.

Similarly, graduates without work experience find themselves unable to obtain appointments because of their lack of experience. They report that preference is given to people with lower-level qualifications who have experience.

To some extent, the issue is a result of the old rigid silos before the NQF, but, in another sense, the issue is the lack of qualifications and clear outcomes for levels of work beyond artisan and production expert levels. General, technical and production management are not clearly defined learning pathways and, although there are some qualifications in these spheres, there is no coherence or clarity in their purpose. (Vorwerk, 2002:26)

One of the outcomes of these discussions was the diagram in Figure 2.

As the text acknowledges, this diagram is a bit of a simplification, but what it indicates is that qualifications can have different purposes and that,

to some extent, they are linked to the institutions with which they are associated. But what is also highlighted is:

…the lack of a coherent set of qualifications beyond artisan level in the working context, which has always been the source of argument, debate and frustration. (Vorwerk, 2002:27)

This analysis found its way into the NQF Consultative Document published by the departments of education and labour in 2003 (DoE/DoL, 2003:19) and formed part of the motivation for what was to become the QCTO.

The lessons from this for mapping the CESM to the OFO are as follows:

1. The CESM contains fields of study and courses which do not exactly relate to the OFO – their purpose is related to other forms of knowledge production, for example academic and scientific research; and

Figure 2: Purpose of qualifications (with link to institutions)
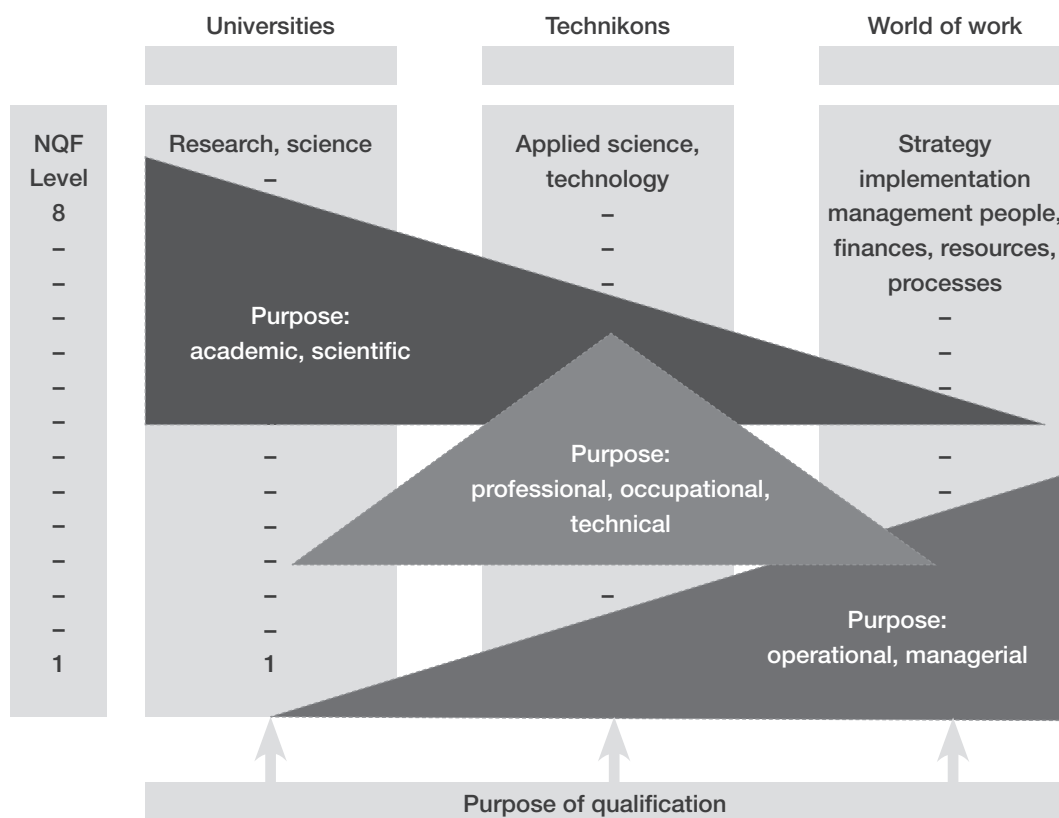
(Vorwerk, 2002:26)

2. Other CESM fields of study and courses relate to the world of work – these are often signalled by words such as 'management' or 'practice'.

After the publication of the Consultative NQF Document, the DoL established a project to formulate initial policy proposals for the QCTO, culminating in draft policy documents for the National Skills Conference in 2008. The task team established working groups and a broad range of stakeholders, including professional bodies, to engage with the issues. The primary focus was on establishing the Occupational Qualifications Framework. During these discussions, it became clear that the notion of qualifications was used in a variety of circumstances and had a number of different meanings.

These were eventually distilled down to the following three types of qualifications, as summarised in the following table:

Table 8: Types of qualifications

	Type	Awarding body	Example
1	Qualified 'in' a field of learning	University	BA, BSc Engineering
2	Qualified 'to' practise an occupation	Regulatory authorities, industry or professional bodies	Air Traffic Controller, Electrician, Company Secretary
3	Qualified 'as' a registered, licenced practitioner	Regulatory authorities, industry or professional bodies	Professional designations, i.e. Chartered Accountant, Professional Engineer, Licensed Pilot, Registered Financial Advisor, Coded Argon Welder

DoE/DoL (2003)

In general terms, in relation to the labour market and the world of work:

• The 'qualified in' represents the entry requirements in terms of knowledge and theory
• The 'qualified to' represents the competence requirements
• The 'qualified as' represents the ongoing practice-related requirements.

These descriptions were then used to define the work of the QCTO. 'Qualified to' had to be linked to an occupation or specialisation on the OFO.

This loose typology has become more important since SAQA has embarked on a programme to register professional bodies and their designations in terms of the NQF Act of 2008. The designation represents the recognition of the 'qualified as'.

Until then, university degrees that ultimately led to professional designations were sometimes referred to as professional qualifications. With the exception of medically related professions this is not quite true. Most professions require an extensive post-university period of training before candidates can enter the profession. These periods of learning are variously named as 'articles', 'internships', 'pupillage', etc. They culminate in a form of assessment, for example 'board exams' or panel interviews.

[The bulk of what follows is based on a report commissioned by the QCTO in late 2011 and early 2012 to establish if the candidacy phase for engineers-in-training could be accommodated on the Occupational Qualifications Framework. The candidacy phase can last from three to seven years. The report was compiled in conjunction with the Engineering Council of South Africa (ECSA) and supported by German Technical Cooperation.]

In many professions, though, there is no formal award of a 'qualified to'. In the case of the professional engineer, the registration process requires that professional competence be assessed. Where the candidate engineer is assessed as competent, the outcome is registration as an engineer, that is, 'qualified as'. The competence, the 'qualified to', is only implicit in the process. There are no credits; if registration is withdrawn at any point, there is no piece of paper to document the initial achievement of competence. The award of the designation, that is, the 'qualified as', subsumes the 'to'. In this case the 'qualified to' component and the 'qualified as' component can be visualised as both sides of the same coin, as represented by the following figure:

Figure 3: The qualification continuum: from formal education to professional designations
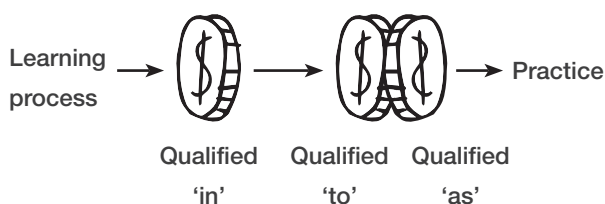
Author

The distinction between 'qualified to' and 'qualified as' may appear subtle, but there are distinct differences. These include the fact that:

- The 'qualified to' could be structured to result in a formal qualification, recognised by credits on the NQF; and
- The 'qualified as' is a designation that can be withdrawn if practice-related criteria are not met.

Typically, practice-related criteria consist of some or all of the following:

- Initial entry requirements (demonstrated competence);
- Continuing practice;
- Continuous professional development (CPD);
- Conformance to ethical standards (rules, codes of conduct); and
- Payment of membership fees.

This model of qualifications, which serves different purposes, acts as a guideline or analytical tool. In many professions and occupations, these different 'qualifications' are not clearly identifiable. They are implicit as, for instance, in the following situations:

- The occupational qualification suffices for a practitioner to practise and there is no requirement for the practitioner to register or be licensed; and
- There is no occupational qualification per se and people are deemed to be 'qualified as' because they perform the required role based solely on experiential learning.

Another use of the model is to understand the institutional architecture of the NQF. Based on this model, the institutional architecture in relation to these qualifications is then as follows:

Figure 4: The institutional architecture related to the qualification continuum
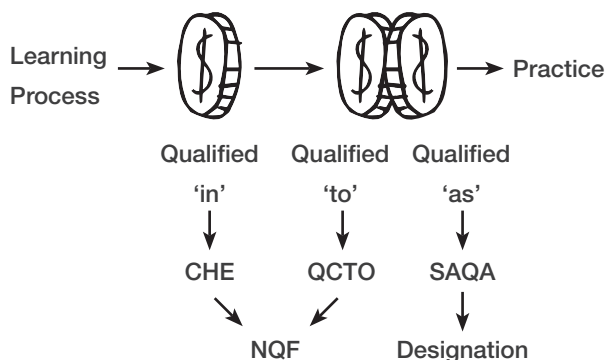
Author

While the diagram refers to the Council on Higher Education (CHE), in reality it is universities which award the 'qualified in' qualification. The Skills Development Act and the QCTO Curriculum and Assessment Policy define the 'qualified to' type of qualification. These are defined as 'occupational qualifications'. The NQF Act and SAQA's document, Policy and Criteria for Recognising a Professional Body, define the 'qualified as'. These qualifications are defined as designations.

As a curious footnote to the engineering example, ECSA awards a general designation, that is, Professional Engineer. No reference is made to the engineering discipline in which the candidate has practised. Any reference back to a CESM or OFO code is extinguished at this point.

Some lessons from the 'real' world

Related to the above is the fact that graduates from a particular field of study will not necessarily enter an occupation related to that field of study, or that people, once they have worked for a while, will not change their occupation, sometimes quite radically.

Whenever the author ran capacity-building workshops on the QCTO and OFO, delegates were asked to introduce themselves by indicating what they had trained as, what jobs they had held, the position they were now in and what they would term themselves from a professional point of view ('What do you call yourself when you fill in forms?').

From this informal research, a number of interesting facts emerged:

1. The older you are, the more likely it is that you have drifted from your original field of study – the most extreme example was a practising geologist who is now an human resources director – without having undertaken any further studies.

2. Many employees start off in general positions, for example personal assistant or administrator, and then move around the organisation until they find their area of interest – some may then just learn on the job, but, in many cases, others commence part-time or distance studies to obtain a qualification from a private or public provider, or from a professional body.

3. A number of people also never practise an occupation related to the degree or other qualification which they studied for at university. There were a number of related anecdotes for the banking industry recruiting graduates with engineering degrees – because 'they've acquired good thinking skills'. There was also a music graduate who became an innovative person in the computer industry – but when he applied to do a master's in information technology (IT) he was told he did not have the right bachelor's qualification.

4. In small companies, the whole underlying logic of both the CESM and the OFO breaks down – employees and owners tend to have multiple roles.

The National Occupational Pathways Framework (NOPF)

The NOPF was originally designated National Career Path Framework but political sensitivities about prescribing career pathways led to it being changed to the NOPF. It was one of the tools developed to help manage the development of qualifications for the QCTO. The original objective was to use it to structure a management information system.

The OFO does not intrinsically describe career pathways. Related occupations might appear in several major groups.

The NOPF evolved over time. The examples are based on a 2009 document (De Jager, 2009) and it was also based on an earlier version of the OFO which preceded ISCO 08.

It is shown below for illustrative purposes.

Figure 5: Mapping of NOPF
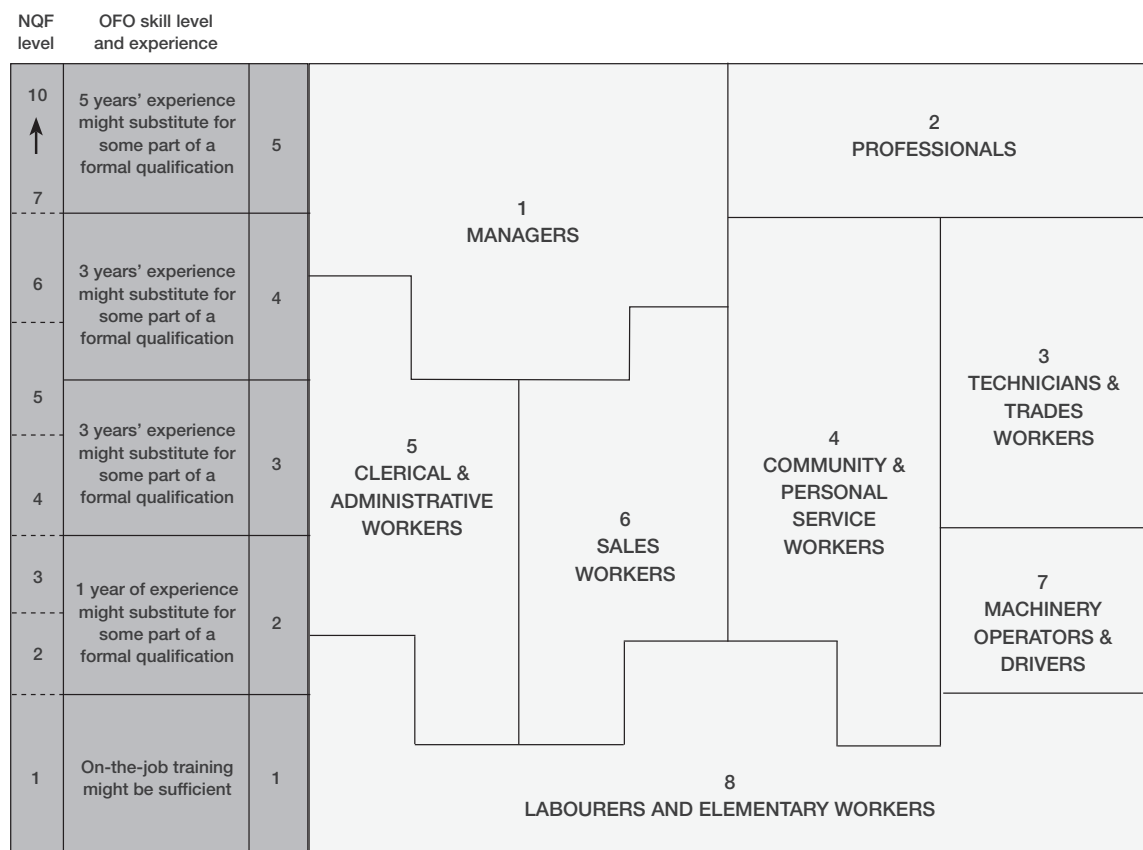
Author

1. The NOPF was mapped to NQF levels

The major groups in the diagram do not correspond with the current version of the OFO. There is an element of fluidity in skills levels of the OFO and they do not map directly to the NQF levels. The fact that the levels do not align directly is quite deliberate. Subsequent versions of this slide used in QCTO presentations attempted to create a direct alignment. ISCO 88[9] used five levels, not the four of ISC0 08 as described earlier.

2. It grouped related occupations into occupational clusters. The grouping was based on such occupations sharing similar knowledge requirements. These occupational clusters were:

1. Business Administration, Information Services, Human Resources and Teaching-related Occupations;
2. Finance, Insurance, Sales, Marketing, Retail and Logistics-related Occupations;
3. Accommodation, Food Preparation and Cleaning Services-related Occupations;
4. Farming, Forestry, Nature Conservation, Environment and Related Science Occupations;
5. Medical, Social and Welfare, Sports and Personal Care-related Occupations;
6. Security and Law-related Occupations;
7. Visual Arts, Design, Installation, Maintenance and Repair Occupations;
8. Production-related Occupations;
9. Demolition, Extraction and Construction related Occupations; and
10. Transportation, Materials Moving and Mobile Plant Operating-related Occupations (De Jager, 2009)

3. Each cluster was further subdivided by fields and occupational families

Unit groups and, where necessary, individual occupations were plotted against the five OFO skill levels. The 2009 version also included a graphical version.

The slide shows the occupations against the then five skill levels of the OFO, the overall occupational cluster, two occupational fields, and several occupational families (delineated by the black outline). The slide also shows that there are many occupations (square blocks) and unit groups (blocks with rounded corners) which did not fit into an occupational family. There were far more of these than was initially expected.

The original inspiration for the occupational clusters was drawn from the major groups of the Standard Occupational Classification (SOC) used by the United States. The US uses its own classification system and not the ISCO-based system.

According to Santa van Niekerk (previously De Jager), the development of the NOPF has ceased, since, at this stage, the QCTO has no apparent interest in using it.

The lesson from the NOPF process for mapping the CESM to the OFO is as follows:

An intermediate grouping and clustering process may prove to be more beneficial than a direct mapping of CESM subjects to the occupations in the OFO.

---

9   ISCO has been revised at 20 year intervals since 1968. ISCO-08 was however only published in July 2010. So they are, in essence, only version numbers.

Figure 6: National Occupational Pathways Framework

Cluster

Information

BUSINESS ADMINISTRATION, INFORMATION SERVICES, HUMAN RESOURCES
AND TEACHING-RELATED OCCUPATIONS

QFQ LEVEL 1 | QFQ LEVEL 2 | QFQ LEVEL 3 | QFQ LEVEL 4 | QFQ LEVEL 5

Field

5421 Receptionists

5412 Inquiry Clerks

5412 Call or Contact Centre Consultants → 5412 Call or Contact Centre Consultants → 5412 Call or Contact Centre Consultants → 5412 Call or Contact Centre Consultants

4516 Tourism and Travel Advisors

Family

4514 Gallery, Museum and Tour Guides

5991 Library Assistants

54399312 Gallery, Library and Museum Technicians

2242 Archivists, Curators and Record Managers

2246 Librarians

234901 Conservator

2244 Intelligence and Policy Analysis

2243 Economists

2245 Land Economists and Valuers

2241 Actuaries, Mathematicians and Scientists

224901 Electorate Office

224903 Immigration Consultant

224904 Patents Examiner

224904 Economic Development Facilitator

224901 Liaison Officer

224906 Lobbyist

224907 Ergonomist

224908 Electoral Officer

Human Resources

5995 Human Resource Clerks

1323 Human Resource Managers

1323 Human Resource Professionals

Source: DHET (2013)

Figure 7: SOC User Guide

2010 SOC User Guide

Standard Occupational Classification and Coding Structure

The occupations in the SOC are classified at four levels of aggregation to suit the needs of various data users: major group, minor group, broad occupation, and detailed occupation. Each lower level of detail identifies a more specific group of occupations. The 23 major groups, listed below, are divided into 97 minor groups, 461 broad occupations, and 840 detailed occupations.

2010 SOC Major Groups

Code	Title
11-0000	Management Occupations
13-0000	Business and Financial Operations Occupations
15-0000	Computer and Mathematical Occupations
17-0000	Architecture and Engineering Occupations
19-0000	Life, Physical, and Social Science Occupations
21-0000	Community and Social Service Occupations
23-0000	Legal Occupations
25-0000	Education, Training, and Library Occupations
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations
29-0000	Healthcare Practitioners and Technical Occupations
31-0000	Healthcare Support Occupations
33-0000	Protective Service Occupations
35-0000	Food Preparation and Serving Related Occupations
37-0000	Building and Grounds Cleaning and Maintenance Occupations
39-0000	Personal Care and Service Occupations
41-0000	Sales and Related Occupations
43-0000	Office and Administrative Support Occupations
45-0000	Farming, Fishing, and Forestry Occupations
47-0000	Construction and Extraction Occupations
49-0000	Installation, Maintenance, and Repair Occupations
51-0000	Production Occupations
53-0000	Transportation and Material Moving Occupations
55-0000	Military Specific Occupations

Some users may require aggregations other than the SOC system built on these major groups. Further details on alternate occupational aggregations and approved modifications to the SOC structure are provided in the following section on page xviii.

Major groups are broken into minor groups, which, in turn, are divided into broad occupations. Broad occupations are then divided into one or more detailed occupations.

29-0000 Healthcare Practitioners and Technical Occupations

(Screenshot: http://www.bls.gov/soc/major_groups.htm circa 2009).

(United States SOC User Guide)

THE MAPPING OF THE OFO TO THE CESM

Santa van Niekerk of the German Federal Enterprise for International Cooperation (GIZ) and Jurie van Zyl of ITAware mapped the OFO to the CESM during the development of the OFO 2013. They did this because the QCTO qualification development methodology required knowledge modules in the curriculum to be linked to the CESM or the NATED (National Technical Education) 190 and 191 reports. The latter contains the list of so-called N-subjects.

They started by trying to link individual occupations to third-order categories on the CESM, but this proved to be too difficult.

Their next approach was to use the unit group level, that is, the 440 groups in the OFO which cluster the actual occupations, and to link these to the 239 second-order study fields in the CESM. A one-to-one mapping of the OFO to the CESM was impossible. Qualifications may contain a variety of major subjects. The following examples illustrate this. (The source for the following information is an informal report authored by Santa de Jager.)

The outcome of the mapping process was that 61 of the 440 unit groups were linked to multiple second-order CESM categories:

- 1 unit group linked to 5 second-order CESM categories;
- 2 unit groups linked to 4 second-order CESM categories;

- 7 unit groups linked to 3 second-order CESM categories; and
- 51 unit groups linked to 2 second-order CESM categories.

Twenty-four of the 61 unit groups could be linked to CESM categories where the second-order category did not all belong to the same first-order category.

Thirty-six of the 61 unit groups could not be linked to a second-order category, but only to a first-order category.

Fifteen of the 440 unit groups could not be linked to any second-order category. Typically, these were unit groups containing a mixture of occupations coded as 9, that is, Not Elsewhere Classified.

In total, 328 unit groups could be linked to a single second-order category on a one-to-one basis, that is, 74.5%. This seems to suggest a high success rate, but the reality is that many of these unit groups are pitched at skills levels 1 and 2. They do not require the kind and range of knowledge contained in the descriptors.

A total of 102 of the 239 second-order categories could not be linked to any unit groups. From a brief review of their data, it appears possible to create additional linkages on a case-by-case basis. This would improve the above numbers. But the question remains: What would be the value of such an exercise?

CONCLUSIONS AND RECOMMENDATIONS

Support for pursuing mapping benefits

Although it became clear that individuals from different divisions of the DHET tended to understand either the CESM or the OFO, there was, however, an interest in exploring how these two systems could be linked. A number of benefits were envisaged from such a mapping process. Firstly, substantial benefits were foreseen through collectively developing a stronger conceptualisation of the interaction between the demand and supply sides:

- Closer links between the supply side (education) and the demand side (labour market);
- A better understanding of how education links to labour market demands, and vice versa; and
- A common framework for the education and skills development directorates within the DHET.

Secondly, colleagues expressed the view that mapping would improve the quality of information on the National Career Path Advisory Portal through:

- The ability to provide more accurate advice on career and learning pathways:
  - If you have subjects x and y, what career choices do you have?
  - If you want to be an x, what subjects do you need to study?

Thirdly, it was argued that, through a mapping mechanism, further benefits could include incorporating:

- A mechanism for tracking the flow of particular graduates into the labour market; and
- A mechanism for being able to support, incentivise or provide guidance in the education system to ensure that there are graduates for particular scarce skills.

Based on the above, there is scope to explore how such a mapping could be done. Further, colleagues feel that benefits may be realised.

Limitations to be taken into account

Though the benefits are evident, a number of limitations must be kept in mind, recognising that the CESM is primarily a higher education management tool.

Firstly, only occupations and unit groups from major groups 1, 2 and 3, that is, Managers, Professionals, and Technicians and Associate Professionals, should be used for mapping links. There really is no purpose in mapping links between the CESM and occupations, or unit groups from the other major groups.

This example suffices to illustrate the problem:

Code	CESM second-order category	Code	OFO unit group
0110	Forestry and Wood Sciences	3143	Forestry Technicians
0110	Forestry and Wood Sciences	6211	Forestry and Related Workers
0110	Forestry and Wood Sciences	6821	Wood Treaters
0110	Forestry and Wood Sciences	8215	Forestry Labourers

Secondly, the unit of analysis in the CESM and the unit of analysis in the OFO are inherently different. To enable a mapping process, a mechanism needs to be found to deal with the situation that:

- Degrees may contain a variety of courses from various second-order categories;
- Occupations do not depend on a single technical or professional subject, and more importantly;
- There is often more than one route to becoming an occupational practitioner.

There is no clear one-to-one relationship between subjects and occupations. There are more likely to be many-to-many relationships, i.e. certain subjects giving career options, and occupations requiring combinations of subjects.

Thirdly, it is argued that the level of occupation that CESMs can be mapped to is at the unit group level, which does not provide enough granularity for the purposes of DHET's skills planning.

Strategic selection of starting point

Santa de Jager of the GIZ felt that qualifications would be a better starting point for any mapping work intended to manage skills planning. However, Engela van Staden of the DHET warned that this was not true for all qualifications, but only for those that have some kind of occupational or professional intent. It would be difficult to link general degrees, such Bachelor of Arts, Science or Commerce degrees, to particular occupational groups. It would be possible to create such linkages in fields such as engineering, a field which already has an occupational intent.

This means that the purpose of the qualification should first be established using the logic of Figure 1 as a starting point. Qualifications are a proxy for programmes and one needs to establish if the programme's objective is foundational, general or occupationally directed, and then consider the combination of subjects in the programme.

From the labour market perspective, one could also identify the knowledge requirements for particular occupations or unit groups, and identify the range of knowledge required. This could then be mapped to the academic programmes.

Finding an appropriate environment for testing the mapping

Testing the mapping process requires a context. It is recommended that the support programme at the DHET's SIP is the starting point for testing an approach to mapping. An advantage is that the SIP occupations identified as priority skills are all already linked to the OFO. One leg of the support required is identified as the foundational qualification needed for each occupation. The use of the term 'foundational' in this context would probably correspond to 'occupationally directed' in the educational context (see the above paragraph).

The benefits of using the SIP support programme for a CESM–OFO mapping process is that:

- There are a limited number of occupations;
- The testing can contribute to providing guidance to role players in the support programme;
- The feasibility of the mapping process can be evaluated; and
- The methodology for mapping can be developed and refined.

Finally, the mix of occupations in the SIP will include intermediate skills, in which case the mapping process may also assist, importantly, in providing guidelines for the development and classification of subject matter in the FET sector.

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ILO ISCO 08

CESM 2009

Interviews

Interviews were held with the following persons:

Ms Adrienne Bird	DHET
Ms Gerda Magnus	DHET
Ms Aruna Singh	DHET
Ms Santa van Niekerk	GTZ/GIZ
Dr Engela van Staden	DHET
Mr Paul West	DHET