



# Employability and Curriculum Responsiveness in Post-School Education and Training

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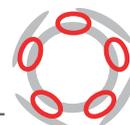
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## LIST OF ABBREVIATIONS AND ACRONYMS

AgriSETA	Agricultural Sector Education and Training Authority
ARM	Automotive Repair and Maintenance
AS	Assessment Standard
BECSA	Bell Equipment Company South Africa
BESSA	Bell Equipment and Sales South Africa
COMET	Large Scale Competence Diagnostics in technical and vocational education and training
DAFF	Department of Agriculture, Forestry and Fisheries
DFWS	Department of Forest and Wood Science
DHET	Department of Higher Education and Training
DUT	Durban University of Technology
E&T	education and training
ECD	early childhood development
ECSA	Engineering Council of South Africa
EIC	Electrical Infrastructure and Construction (NCV)
EMEAT	Earthmoving Equipment Apprenticeship Training
ERD	Engineering and Related Design (NCV)
FET	further education and training
FSA	Forestry South Africa
FP&M SETA	Fibre Processing and Manufacturing Sector Education and Training Authority
FYA	First-year Academic Programme
GDP	gross domestic product
HCT	human-capital theory
HEQC	Higher Education Quality Committee
HEQSF	Higher Education Qualifications Sub-framework
HSRC	Human Sciences Research Council
IEA	International Engineering Alliance
LMIP	Labour Market Intelligence Partnership
LOs	learning outcomes
merSETA	Manufacturing, Engineering and Related Services Sector Education and Training Authority

MUT	Mangosutho University of Technology
NCV	National Certificate (Vocational)
NDP	National Development Plan
nGAP	New Generation Academics Programme
NMMU	Nelson Mandela Metropolitan University
NPC	National Planning Commission
NQF	National Qualifications Framework
NSFAS	National Student Financial Aid Scheme
PAMSA	Paper Manufacturers Association of South Africa
QCTO	Quality Council for Trades and Occupations
SACGA	South African Cane Growers' Association
SAG	subject and assessment guidelines
SAQA	South African Qualifications Authority
SASA	South African Sugar Association
SASMAL	South African Sugar Millers' Association Ltd
SASRI	South African Sugar Research Institute
SETA	Sector Education and Training Authority
SMME	small, medium and micro-enterprise
SMRI	Sugar Milling Research Institute
SOs	subject outcomes
STC	Shukela Training Centre
TVET	technical and vocational education and training
UoT	university of technology
WIL	work-integrated learning
WPL	workplace learning

# EXECUTIVE SUMMARY

The relationship between educational processes and the employment of individuals is a significant policy concern and a widely debated social issue in South Africa. The apparent mismatch between industry needs and the educational outcomes of the South African system points to a potential lack of responsiveness on the part of the education institutions to enhance the employability of their graduates. This study, being a part of the Labour Market Intelligence Partnership's *Theme 4: Reconstituting the Post-School System*, is concerned with understanding the interface between the various dimensions of the curriculum and the drivers of institutional and curriculum responsiveness within the context of debates about employment and employability.

Employability is a contested term, referring at times simply to being able to find employment, elsewhere referring to 'soft' or generic skills, or referring to the ability to retain work and grow within an occupational pathway. This latter perspective, informed in part by a capabilities approach, provides a broader view than the dominant individualist approach to employability and focuses on the enabling conditions that make accessing employment possible. The approach to curriculum responsiveness builds on this notion and on earlier work in higher education studies. We identify five broad drivers that shape curriculum responses and which enable or hinder employability:

- Employers (as drivers of both demand and supply with regard to labour and to education and training);
- Students/workers/job-seekers;
- Policies and regulations;

- Societal and environmental issues; and
- Education and training organisations.

The methodology was to use the lens of curriculum responsiveness to explore, through case studies, the relationship between education, training and employment in two economic sectors, namely agribusiness (sugar and forestry) and automotive production and maintenance, by looking at the aforementioned five aspects as identified in each sector.

The case studies consisted of the following: As regards the sugar industry, we focused on the role of the South African Sugar Association, particularly the various training programmes run by the Association. We also examined the training of chemical engineers who work in both sugar and forestry. With respect to the forestry, paper and pulp sector, we selected forestry-specific programmes offered at two universities, while also including interviews with employers and Forestry South Africa, documentary analysis of other programmes, and a specialised engineering programme sponsored by the paper and pulp industry.

For the automotive manufacturing and maintenance sector, we included case studies of the curriculum of the National Certificate (Vocational) in Automotive Repair and Maintenance, interviews with informal-sector mechanics, an analysis of the artisan-development programme at a prominent automotive manufacturer, the mechanical, industrial and electrical engineering programmes at one university of technology, and a case study of a heavy-equipment manufacturer.

The broad insights from the seven case studies were synthesised in relation to the five curriculum drivers and were then discussed thematically. In terms of *employers*, the key finding was that there was no single view as to what makes people employable and what employers' responsibility was in terms of training. Most critically, employers attached much value to reputation and trust as regards qualifications, signalling a critical need to raise awareness about new qualifications. General concern was expressed about the poor levels of general education, and this was directly related to the 'soft' skills often associated with employability. The case studies revealed a number of very positive partnerships between employers and education providers, and there was a general willingness to engage. There was also a question about how closely programmes should be aligned to a specific industry, as this may in fact limit employability and, ultimately, make the programme unattractive.

Taking *student* needs into account varied across the cases. Structured programmes of support or simply caring lecturers made a difference. For most students, the greatest obstacles were material issues such as accommodation, transport and food. Addressing the obstacles requires a multipronged approach.

*Policy* (or the lack thereof) framed the curriculum and, in some instances, constrained what could be achieved. For example, the requirements of the National Qualifications Framework made it difficult to combine different levels of knowledge and purpose in one work-oriented programme. Requirements for work-integrated learning (in the form of work placement) created blockages in the system that were beyond the control of education providers. Policy and regulations also facilitated coordination within a sector or industry that made it easier to respond at that level to skills needs. Where policy or regulations require a response based on compliance, there are also *social and environmental* pressures and concerns that demand a response on the basis of an ethical and social-justice imperative. These responses may at times sit in tension with employer perspectives but do offer a vehicle through which wider generic skills can be taught.

The final driver that shapes the curriculum is the *organisation* itself. The curriculum is always mediated by the capacities and resources available in the organisation and has to align with organisational procedures. Curriculum decisions are shaped by staffing needs, organisational systems and priorities, and strategic decisions such as cross-programme outcomes.

Overall, the findings suggest that *curriculum* responsiveness is a complex interplay of multiple factors and not a simple correspondence between employer needs and the curriculum. Furthermore, it is not helpful to view the curriculum narrowly in terms of what is part of a single qualification. Rather, it should be understood as a course of learning with a specific end goal, namely competent practice in an occupational field. In order to achieve this, the formal learning in a qualification is a component but not the entire pathway. Critically, there needs to be a recognition of which learning is assumed to be in place before (and of the measures to redress gaps) and of which learning will happen once the student enters the workplace. This is partially addressed through work placement but also through mentorship and induction, which employers should structure much more systematically as part of the curriculum.

The question as to whether programmes should be focused on specific industries or should focus on *occupations* more broadly emerged in a number of cases. Training at a broader level increases employability, because workers are able to move from one industry to another. However, some occupations are industry-specific, so this cannot always be applied without sacrificing the core knowledge underpinning the occupation. What emerges as critical in this debate is the degree to which specific industries or firms accept that they need to have training programmes in place that allow the student to make the transition from the general occupational level to the specificities of the job in context.

A recurring theme across the cases was the issue of *trust* between parties and within specific institutions or programmes. This is based on *partnerships* in many cases where relationships are

developed. These provide a number of models for engagement. Partnerships are not easily sustainable without commitment and resources (particularly time), and this is something that needs to be supported. There are also examples of lack of trust in the unknown, which results in programmes not leading to employment. In these cases, the curriculum itself is not at issue, but rather perceptions about the institution or programme.

Finally, the cases highlighted the need to view the interplay between different components of a *skills ecosystem*. There is an interplay between higher levels of skills and intermediate skills, the formal and informal economy, locality and local-level policy, and work and its organisation. Skills planning thus needs to look at the dynamics within a specific region in order to understand which skills are needed locally, what can be attracted from elsewhere, and how these mechanisms work. Having a good skills set in the wrong place has a direct bearing on employability.

The policy implications for skills planning are discussed in each of the case studies. The cross-cutting implications are discussed in relation to each of the key stakeholders. There is a general recognition that perhaps the single biggest intervention would be to improve the quality of basic education, but this is beyond the scope of this report. Furthermore, no education policy will resolve macroeconomic factors that affect the labour market. Nevertheless, there are specific actions that can be taken.

The *Department of Higher Education and Training* has oversight responsibility and is the major employer of vocational teachers. Developing policies that encourage partnerships and build relationships, including resourcing these, is key. Further, clarifying what is meant by an ‘occupational field’, and then providing training and incentives for lecturers to connect to their occupational field, is

critical. Clarifying the policy with respect to work placement and its funding is crucial for removing blockages in the system.

*Sector Education and Training Authorities* are ideally placed at the interface between employers and education providers. Facilitating the connections between the two should be a central mandate and should go beyond simply assisting with the placement of students. Creating forums where curricula can be discussed collectively between employers and education providers could be a productive space for curriculum negotiation.

For *employers*, a key implication is seeing training, induction and mentorship as an integral part of producing an employable person. Education providers cannot produce work-ready graduates for every setting. They need to provide graduates who are able to learn in the workplace, and this learning needs to be systematic to ensure maximum benefit to both parties. Skills levy funding should be made available for this.

The qualification structure, while more flexible under the new subframeworks, is still viewed as being restrictive in some respects, particularly in that the level descriptors make too little allowance for the different levels of knowledge required in a work process. The *South African Qualifications Authority* and the *Quality Council for Trades and Occupations* should conduct research into this matter. High levels of industry-specific specialisation should be discouraged in favour of broader occupational-level qualifications as far as possible.

The report concludes with a reflection on the need to view employability as a function of a complex interplay between policy, various actors and education, in the context of broader economic processes. Making someone employable is only possible if these different dimensions are brought together.

# INTRODUCTION

The relationship between educational processes and the employment of individuals is a significant policy concern and a widely debated social issue in South Africa and elsewhere. There is a continual lament about the challenges of youth unemployment coupled with concerns about lack of skills. This apparent mismatch between industry needs and the educational outcomes of the South African system points to a potential lack of responsiveness on the part of the education institutions to enhance the employability of their graduates. However, internationally, there has been extensive debate about the precise meaning of the concept 'employability', with quite divergent empirical and theoretical arguments being deployed. Without a clear sense of what exactly 'employability' means and of what determines employability, it is difficult for education institutions to be responsive. 'Responsiveness' as a concept is linked to employability, but it is not solely about employability. A number of drivers push institutions to respond in various ways: these may be wider societal priorities, government policies, local-community needs, student needs, environmental factors, and future scenarios, among others.

Central to both student employability and the responsiveness of an institution to the various drivers is the curriculum. The curriculum is the medium through which knowledge is selected, translated and transferred, and it represents both the official intentions of an education institution and the lived experience of teaching and learning of the participants within the institution. A study of the curriculum in all its dimensions thus provides a productive lens for making sense of the various

forces at play in the processes of developing student employability through responsiveness.

This study, being a part of the Labour Market Intelligence Partnership's Theme 4: Reconstituting the Post-School System, was thus concerned with understanding the interface between the various dimensions of the curriculum and the drivers of institutional responsiveness within the context of debates about employment and employability. Its importance is highlighted by the national and international focus on the very precarious position of young people vis-à-vis work (Perold, Cloete & Papier 2012; Standing 2010). In South Africa, particularly, the challenge of the high rates of youth unemployment in the context of a reported shortage of skills demands attention.

## Project overview

The overarching aim of this project is to explore curricula offered by a range of training providers in order to understand how institutions respond to the needs of industry and the employability of students/employees. The project examines case studies in two subsectors of the South African economy: automotive and agribusiness (specifically forestry and sugar). These industries have been selected because they each have a range of skills from very low-skilled manual labour to high-skilled engineering and management. They operate spatially across rural and urban contexts and have international and regional linkages. In addition, there are big corporate concerns working alongside informal, small and medium enterprises, as well as micro-enterprises. They thus provide a manageable yet

very diverse set of skills demands across a range of industry types in various contexts.

There are three subfoci to the project:

1. To interrogate industry expectations when recruiting for a variety of professions, occupations and trades. This was contrasted and compared with wider discourses about employability, preparedness, and skills;
2. To examine, in the light of industry and wider expectations, examples of curriculum responsiveness across a range of qualifications at different National Qualifications Framework (NQF) levels and provided by diverse training institutions; and
3. To identify possible policy implications and guidelines for best practice that may emerge from the case studies.

A number of qualitatively different case studies comprise the final project output. These are outlined in detail in the subsection on methodology and are summarised in Section 2 of the synthesis report.<sup>1</sup>

## Conceptual frame

Central to the study is the conceptualisation of responsiveness and employability as the dynamic interaction of a set of variables (Wedekind 2012). The notion that the vocational education system, or indeed the entire education system, should be 'responsive' can be traced back to the 1970s and 1980s in South Africa as well as internationally. What underpins this notion is a general critique of vocational education that suggests that it is too school-like, outmoded and disconnected from the world of work. Given the rapid pace of change both socially and technologically, the critics suggest that vocational education must be flexible and adaptable by responding to the changing demands of employers. Education institutions are expected to be responsive by developing partnerships with industry, by determining the curriculum in collaboration with employers, and by linking their staff and students to workplaces (Badroodien & Kraak 2006; Department of Education 2004). In

South Africa, there is an additional imperative in that educational institutions also need to be responsive to the wider transformation goals of society and to address the legacies of apartheid and gender discrimination by ensuring that young people who have been historically disadvantaged are given access to skills.

Exactly how an institution is 'responsive' is less clear. Much of the focus is on being more flexible in the curriculum content in order to adapt to changing conditions, but also ensuring that the graduates from programmes are employable. Moll (2005) has developed a model of responsiveness in higher education that broadens the frame away from a narrow understanding of responsiveness to employers, and suggests that a responsive curriculum must take account of a range of factors: economic responsiveness (employers, the market); cultural responsiveness (ethnic, cultural, religious, and learning-styles diversity); disciplinary responsiveness (the disciplinary community that generates new knowledge through research); and student responsiveness (the needs of the student). This begins to highlight the complex ways in which the curriculum in higher education is responsive, but, arguably, does not go far enough in distinguishing between some of the competing pressures. For instance, Moll's model only obliquely refers to policy as an instrument of economic responsiveness, yet, at times, regulations and policies may be at odds with market forces. Similarly, responding to broader social or ethical concerns (such as environmental issues) does not neatly fit into the categories developed by Moll. This will be discussed further below.

While the discourse regarding responsiveness focuses on the education system and its curricula and institutions, there is a linked discourse in respect of employability that focuses on the 'product' of the system, namely the student or learner (Cleary, Flynn & Thomasson 2006; Fejes 2010; Hillage & Pollard 1998; McQuaid & Lindsay 2005). Like the responsiveness discourse, employability often starts with an analysis of what employers look for when they make decisions about prospective employees. This is often translated into a checklist of attributes and skills that people need

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<sup>1</sup> Copies of the case studies are available on the LMIP website [www.lmip.org.za](http://www.lmip.org.za)

in order to be employed (and also to stay employed and progress in employment) (see Hillage & Pollard 1998). While there are many different definitions of employability, and although the concept has evolved historically, these can broadly be divided into supply-side and demand-side definitions (McGrath, Needham, Papier & Wedekind 2010). On the supply side, which is the dominant approach, the focus is on the individual and the set of skills that such individual brings to the employment equation. There is much debate as to what constitutes these skills and how they should be categorised. Increasingly, the focus is on generic skills that are linked to attitudes, dispositions and personal characteristics rather than the specific skills required to carry out the tasks associated with the job. This has led to a growing focus on communication and presentation skills, career guidance, and suchlike, rather than job-specific skills. Indeed, this is in part a consequence of the hollowing out of skills required for specific jobs.

On the demand side, there is a range of social and economic policies and conventions that enable employability. For example, a social contract between unions and employers about training, or government employment schemes to enable young people to gain work experience may be understood as enhancing employability. The National Skills Accord is an example of this sort of approach (Department of Economic Development 2011). In the South African context, both approaches are relevant, but this report focuses primarily on the supply side.

Boltanski and Chiapello (2005) argue that the concept of employability emerged as definitions about the nature of work shifted from an emphasis on security (within a firm; along a career path; backed up by state benefits) to one of 'autonomy' and defining work as projects. It is the 'capacity people must be equipped with if they are to be called upon for projects' that defines employability (2005: 93). If the way work is experienced has shifted from a career to a series of projects, this has been coupled with the idea of the self as a 'project' under continuous construction and provides the basis for discourses of lifelong learning, adaptability and articulation (Young 2008). The discourse in

respect of employability ultimately shifts responsibility for employment to the individual, in that you are responsible for your learning and the learning makes you employable.

Both the concepts of responsiveness and employability can be linked to human-capital theory (i.e. the theory that investment in education and training raises productivity, leads to economic growth, and improves individual life chances), which dominates discussions about education and development. In the employability discourse, a common assumption is that education is both a necessary and a sufficient condition for enhancing individual job security and prosperity. Human-capital theory (HCT) leverages this idea in order to promote the targeted development of a nation's workforce and posits increased levels of national well-being and economic progress as the expected outcome. Reflected in a growing body of international work, however, is the problematisation of the sufficiency of education for employability (Boni & Walker 2013; Green 2013; Winch 2013). For example, in a critique of HCT, Green identifies three key theoretical and methodological weaknesses: firstly, a failure to account for the socially determined nature of skills development; secondly, HCT's tendency to minimise the role of the demand side of the labour market in a time of constantly changing education systems; and, thirdly, 'a too simplistic conception of the politics of skill formation' relative to the positions of nation states in the global market (2013: 145). In sum, global, national and regional forces can influence people's life chances regardless of their educational attainments.

The opportunities people have to develop a range of capabilities – defined by Sen (1999) as sets of possible functionings – vary according to the specifics of the contexts in which individuals are located, whether by choice or socio-economic forces. A crucial inflection of Sen's concept of capability is that of human flourishing where freedom, personal agency and choice enable people to direct their lives to that end. Accounting for forces that enable or constrain human flourishing, in Sen's particular sense, should thus be a key focus of social studies in general and educational research in particular. With this in mind,

the concept of employability is expanded not only to mean the ability of a person to find employment, but also to find suitable employment, to retain that employment, to have opportunities to progress within a career path or to move into other pathways, and, ultimately, to be fulfilled through the work that they do. This notion of employability widens the lens from a limited question of what one needs in order to be deemed desirable as an employee to a more holistic perspective on employment and work. It raises the difficult matter of measurement of complexity in relation to planning.

There are three interlinked and interactive processes of synthesis that guide the final analytic framework. The first and overarching synthesis is between employability and capabilities: these are linked to allow for greater degrees of theoretical flexibility in accounting for contextual variability (Sen 1999; Boni & Walker 2013). The formation of work-process competence and occupation-specific identity through training and skills development constitutes the second synthesis (Rauner 2005; Rauner & Maclean 2008). The third synthesis positions specialised disciplinary and occupation-specific knowledge as the foundation of curriculum responsiveness (Gamble 2004; Wheelahan 2010a; Gamble 2014).

Building on Moll's framework, curriculum responsiveness is constituted by five contextual stimuli that impact on employability and which reflect the extent to which responsiveness is enabled or constrained in the uniqueness of the South African milieu.

The five contextual dimensions that create drivers of responsiveness are the following:

1. Employers (as drivers of both demand and supply with regard to labour and education and training (E&T));
2. Students/workers/job-seekers;
3. Policies and regulations;
4. Societal and environmental issues; and
5. E&T organisations.

These drivers are operationalised as the empirical parameters framing this project.

Forces of ongoing supranational economic instability, globalisation and processes of rapid, continual change are acknowledged as macrolevel stimuli. It is understood that structural features of the economy may indeed be the greatest inhibitor of employability. However, while these overarching dimensions are important to understand, this project is concerned with the institutional and individual levels.

At the level of *employers*, the project is concerned with how they identify and define skills needs, which criteria they use for determining who to employ, which shortages and surpluses they experience in the labour market, and what they do about training current and future workers. This line of interrogation is the traditional basis for definitions of the competence required to be employable and is widely used to generate lists of skills needed to be employable. An expanded concept of competence as the progressive, systematic cultivation of occupation-specific and diverse personal skills that enhance employability is needed if one looks at the *student/worker/employee*. Here, the project will focus on understanding the wider dimensions of employability that link in with commitment to and identity with respect to the profession (as opposed to the employer), personal skills, attitudes and values linked both to the work and to wider social responsibilities.

Education institutions and their programmes and curricula also need to respond to the personal and pastoral needs of the students in their care and understand their wider educational needs that are related to their prior education and their future mobility. At a broader level, curricula need to respond to *policy requirements* (regulative and symbolic) such as labour laws, or affirmative action, or health and safety regulations that may not always be identified by employers as requirements. Similarly, *social, cultural and environmental* issues require responses in the curriculum that enhance capabilities and competence in the expanded sense but which may not be identified by employers. Finally, *the institution* itself needs to respond to a range of internal dimensions such as its human and physical resources, managerial capacity, and location in developing its curriculum. These

dimensions of responsiveness shift the focus away from a narrow employer-led view of responsiveness and employability to a wider, socially located responsiveness and a notion of employability that is not focused narrowly on the first entry into employment but on the longer-term needs of the employee.

## Methodology

The research was conducted by a team of researchers that consisted of a project leader, a research coordinator, a postdoctoral student and a number of masters and PhD students whose dissertations were either core or peripheral to the study.<sup>2</sup> In addition, a few projects used fieldworkers, who also contributed to some of the preliminary analyses. The methodological challenge has been to allow each case study and, particularly, the student-led cases, to develop its own conceptual and theoretical focus while still contributing to the overall project.

The research project was undertaken in three phases. Firstly, the research team spent time developing a common understanding of the literature and issues that had shaped the research problem. This was done through a series of seminars where literature reviews for the case studies and concepts were discussed and debated by the team. One of the team members was also commissioned to complete a literature review on employability for the Labour Market Intelligence Partnership (LMIP) more generally (Watson 2014) which shaped the understanding of the team as a whole. This built on an earlier report for the LMIP when it was first conceptualised (Wedekind 2012). The research team was thus able to develop some common understanding of the key concepts without prescribing the specific methodology of each case.

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<sup>2</sup> The difficulty with incorporating student work is that the logic for completing a qualification through research differs from that for delivering a report. Thus not all the students had completed their research by the time the project ended. Also, some students dropped out of their studies for a variety of reasons; hence their case studies could not be included, although their preliminary findings did inform the review of literature, and so forth.

Once we had some conceptual clarity, we selected two broad economic sectors to focus on. The first was the agribusiness sector, with a focus on sugar and forestry, paper and pulp, and the second was the automotive industry. Both of these are important sectors in the regional economy, have a strong rural dimension with an industrial component at the milling end, and have a wide skills spectrum from very low-skill workers (mainly in the plantations) to medium and high-end skills on the engineering and research sides of the industry. How these different occupational and skills patterns interlink was also a consideration. The two industries have certain commonalities, but there are distinct differences in the way they are coordinated and how the education and training system is established. Two papers were commissioned by the research team that provided a background on the sugar and forestry sectors. A similar paper on the automotive sector was commissioned by the Human Sciences Research Council (HSRC). We also collected adverts for various positions at different levels in the two sectors and analysed these in terms of the stated skills and attributes employers were signalling that they required. This gave us a preliminary insight into employer requirements which we used as a basis for further engagement across the projects.

With regard to the sugar industry, we focused on the role of the South African Sugar Association (SASA) and its substructures. The focus was on the various training programmes run by the SASA. We also examined the training of chemical engineers who work in both sugar and forestry. With respect to the forestry, paper and pulp sector, we focused on two forestry-specific programmes offered at two universities, while also including interviews with employers and Forestry South Africa (FSA), documentary analysis of other programmes, and a specialised engineering programme sponsored by the paper and pulp industry in order that we might explore an existing partnership.

The second industry that we focused on was the automotive manufacturing and maintenance sector broadly, from automotive repair and maintenance through to mechanical engineering. This industry includes employers in the informal sector, in the

small, medium and micro-enterprise (SMME) sector, and in large and multinational sectors and thus offers a range of different types of employment opportunities. In this sector, we included case studies of the curriculum of the National Certificate (Vocational) (NCV) in Automotive Repair and Maintenance, interviews with informal-sector mechanics, an analysis of the artisan-development programme at a prominent automotive manufacturer, the mechanical, industrial and electrical engineering programmes at one university of technology, and a case study of a heavy-equipment manufacturer.

Once students had identified their specific projects, the research coordinator, project leader and postdoctoral fellow took responsibility for three of the cases. The cases are described in more detail below. In addition, where a specific case study did not plan to engage with students or employers (such as the curriculum analysis of the NCV), the research team added interviews to supplement the case data. The challenge for the research team was to integrate a very divergent set of case studies into a coherent analysis. The definition of what constituted the case varied a great deal. In some instances, the case was defined by the employer or a sectoral organisation, while others were defined as a programme or an E&T provider. This provided the benefit of multiple perspectives on the issue of employability and responsiveness, but also posed the challenge of comparability and conceptual coherence. Ongoing team meetings to consider emergent findings shaped both the cases (and expanded their scope in some instances) and the

conceptual understanding. In cases where the focus was institution-linked, interviews were conducted with role players such as employers so as to strengthen the data available for the synthesis.

While the two broad economic sectors were discrete, a number of points of overlap emerged as the data was gathered. For instance, all industries studied require engineers of different levels and specialisation, and these are not trained for specific industries. Thus we were able to compare how different employers or coordinating bodies interacted with a single engineering faculty. At another level, while the heavy-equipment manufacturer was firmly in the automotive manufacturing sector, the products were used extensively in the sugar and forestry sector and thus the intersections between the industries became increasingly apparent. The manufacturer also participated in the advisory structure of the university and so provided particular insights into how the process worked.

The synthesis report attempts to do more than summarise the cases. It is the outcome of the cumulative process of the team engaging with the literature, the case studies, the wider LMIP research process, and the constantly shifting social and policy context. The next section provides a short summary of the seven case studies. The full case studies can be accessed as PDF documents in the LMIP repository at [www.lmip.org.za](http://www.lmip.org.za) and full references to claims made in these summaries can be found there.

## 2. THE CASE STUDIES

### **Case study 1: Bridging the engineering skills gap: A case study of curriculum responsiveness in a South African university of technology**

#### **Introduction**

This case study provides an institutional perspective on the question of curriculum responsiveness by looking at the ways in which a faculty of engineering at a university of technology (UoT) responds to various curriculum drivers and seeks to enhance student employability.

The engineering profession is critical to the realisation of Vision 2030 envisaged in the National Development Plan (NDP). In its submission to the National Planning Commission (NPC) on the NDP, the Engineering Council of South Africa (ECSA), together with other engineering stakeholders, stated that engineering practitioners are problem solvers who have the ability to 'transform a situation from an initial state to a desired state via a solution path' (Hanrahan 2012: 2). Compared with other emerging economies, South Africa produces very few engineering graduates per year. For example, Brazil and India have engineer-to-population ratios of 1:227 and 1:157, respectively, while South Africa's ratio is 1:1 366 (Du Toit & Roodt 2008). The shortage of engineering professionals, especially with mid-level skills, has been exacerbated by the deterioration of the apprenticeship system starting in the mid-1980s. The White Paper on Post-School Education and Training aims to graduate 30 000 engineering artisans per year by 2030 (DHET 2013).

Engineers at all levels are required by both the agribusiness sector and the automotive sector. In

the former, increasing mechanisation, logistics, and the milling processes require a range of artisans and engineers. Various categories of mechanical and chemical engineers oversee the design, production and maintenance parts of the industry. The engineering programme at the university of technology was selected because the programme offers a range of specialisations at different levels that can lead to registration with the ECSA as a professional engineer, an engineering technologist or a certificated engineer. Furthermore, the faculty had existing relations with the sugar industry, the pulp and paper industry, and large automotive- and equipment-manufacturing companies.

#### **Approach**

Located firmly within the broader objective of the overall project, which sought to explore institutional responsiveness and student employability in vocational education and training curricula, this case study explored the determinants of curricula a responsive engineering curriculum. The case study draws on data collected through smaller, embedded cases based on each department in the faculty of engineering that was relevant to the automotive or agribusiness sectors. The study began with a focus group with ten heads of departments and the deputy dean of the faculty. This was followed by individual, in-depth interviews with heads of department from the departments of chemical engineering, industrial engineering, electronic engineering, and mechanical engineering, as well as the head of the Pulp and Paper Technology Programme – a unit of the Department of Chemical Engineering. Further focus-group discussions were conducted with groups of students from chemical engineering, industrial

engineering, electronic engineering, and pulp and paper technology. Respondents from these departments were selected because of the departments' central position to both the automotive and agribusiness sectors. Data from interviews were corroborated by documentary evidence from the UoT's website, Faculty of Engineering handbooks, other documents from the Paper Manufacturers Association of South Africa (PAMSA) website, and the transect walks<sup>3</sup> across the facilities in the departments.

## Findings

The findings reveal that formulating and implementing a responsive engineering curriculum is influenced by a multiplicity of variables. Engineering education providers need to respond to internal as well external demands. In some cases, they are required to align their curriculum with international standards and requirements, as well as remain relevant and appropriate to national and institutional imperatives. What follows is a brief overview of such considerations and the opportunities and challenges they face in trying to provide relevant engineering education.

Firstly, the engineering qualifications programmes mix and curriculum must be responsive to the ever-changing global environment and allow portability across nations through international benchmarking by global engineering institutions such as the International Engineering Alliance (IEA) and its profile for engineering graduate attributes and competences. The IEA was established through international engineering agreements. The ECSA, a signatory to these conventions, is well placed to influence the structure and content of the engineering qualification programmes at South African UoTs. It is empowered by law to set and audit academic standards at universities for the purpose of registration and accreditation of engineering programmes and professionals.

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<sup>3</sup> A transect walk is a methodology drawn from rural development where resources, features and landscapes are recorded across a particular transect. In the context of this research, this involved a guided walk through the key teaching facilities in order to document the resources available for teaching and how these are arranged.

In order to produce a holistic graduate, both the ECSA and the IEA allow for the inclusion of complementary studies other than engineering sciences, natural sciences and mathematical sciences in the engineering qualification mix (ECSA 2012; IEA 2013). This broadens engineering graduates' or diplomates' outlook and equips them with 'soft' and transferrable skills. As part of complementary subjects, and in line with the need to improve the employability skills of all graduates, the UoT has been curriculaing general education modules. These modules have been structured into three classes of themes, namely personal, social, and global and work.

While the policies and regulations pertaining to the formulation and implementation of responsive engineering curricula appear to be seamless, local realities and contexts may pose impediments. Some of the factors that hamstring learning are non-curricular and are beyond the jurisdiction of the university. These include factors contributing to high student attrition rates and to challenges in recruiting and retaining engineering academics.

The problem of low throughput and reduced graduation rate is often attributed to challenges associated with workplace learning (WPL), commonly referred to as work-integrated learning (WIL) or cooperative education. Often, students fail to secure WPL opportunities. In some cases, they get the opportunity, but fail to return to the UoT to complete their studies after being offered employment. Besides exacerbating the problem of low throughput, WPL poses logistical challenges for academics required to supervise such students who are attached to industry located in places that are far away from the UoT.

In certain cases, the problem of low throughput is attributed to the underpreparedness of matriculants. Most academics interviewed indicated that there is a huge articulation gap between high school and university, for which school leavers are not well prepared. High school mathematics and sciences have been cited as areas of concern.

Staffing the engineering faculty is also a challenge that may impede the implementation of a

responsive engineering curriculum. This problem appears in three forms, namely poor teaching methods on the part of lecturers who often lack any teaching qualifications, a lack of lecturers, which is made complex by competition with industry, and a lack of a new generation of academics, particularly among black Africans. The shortage of lecturers often results in high student:staff ratios. Academics also bemoan the lack of resources and the existence of old facilities.

Interviews with students revealed that they experienced some challenges. The first challenge was that, although they understood engineering as a field, they did not know about its different disciplines or branches. They only became aware of what they were studying when they came to the UoT. Other problems included inability to access National Student Financial Aid Scheme (NSFAS) bursaries. In certain cases, the timing and logistics of such bursaries did not suit the poor rural students. The annual book allowance was not enough to cover the books that often change each semester. The language of instruction, namely English, was a challenge for some students.

Some students in the Pulp and Paper Technology Programme were worried about the narrow focus of the programme. They reported that this could adversely affect their transition to other industries. The fact that their programme was not ECSA-accredited was also a source of discontent among students. Consequently, some students joined the chemical engineering programme after graduation.

### **Conclusion**

A number of lessons can be drawn from this study. This case study has highlighted the importance of the professional body, the ECSA, in engineering-curriculum processes. Together with other societal imperatives, the ECSA seems to determine much of curriculum content, direction and other processes at the UoT. This case study has established that there is little awareness of the different engineering disciplines among students. Strategies to make the engineering profession visible are needed. Throughput was seen to be one of the major challenges that engineering education faces. Reasons for this were seen to be curriculum- and

non-curriculum based. A comprehensive investigation of these problems is needed to propose appropriate measures to curb the problem of low throughput at the institution. There is a need for a policy framework that guides the roles and responsibility in these partnerships, as there is none at the moment. In the spirit of redress and equity, there is a need to incentivise the supply of black South African and women engineering academics. The newly introduced New Generation of Academics Programme (nGAP) is an important step towards realising equity while addressing the shortage problem, although it will be some time before its effect can be realised.

### **Case study 2: The South African sugar industry: A case study of curriculum responsiveness in a coordinated industry**

This case study examined the benefits and risks of an industry-wide, coordinated approach to skills development. The sugar sector makes an important contribution to the national economy and, in particular, sustainable economic development in rural areas of KwaZulu-Natal and Mpumalanga (NAMC 2013). Because there are strong linkages between the sugar sector and other sectors of the economy such as manufacturing, trade, financial and business services, community services, and transport and communication, the sugar industry has one of the largest multiplier effects in the economy and in the agricultural sector in particular (NAMC 2013).

Sugar production in South Africa comprises two distinct activities: the production of sugar cane and the milling of sugar cane to extract sugar, with a mutually dependent relationship existing between the two. Around this symbiotic relationship a structure exists that not only governs and administers it, but also supports the sector through training, research and development, extension, and sugar marketing. This structure includes the activities of the South African Sugar Association (SASA) and the organisations that represent the growers and millers in these industry structures, namely the South African Cane Growers' Association (SACGA) and the South African Sugar

Millers' Association Ltd (SASMAL), which, in turn, are serviced by the South African Sugar Research Institute (SASRI), the Shukela Training Centre (STC) and the Sugar Milling Research Institute (SMRI).

The overview of the sugar industry paints a picture of a highly coordinated industry that has a high level of investment in knowledge production and dissemination, as well as a well-coordinated training system that targets skills needs at all levels. SASA and its substructures are both an employer that provides training for its employees and a body that is interested in maintaining a supply of skills that service its needs. The SASRI, the SMRI and the STC in particular are also providers of training for the growers and millers. In this regard, it can be asked: How well does this system work in terms of enhancing the employability of the existing workforce and creating new skilled workers for the sector, and how might these strengths and weaknesses inform policies and practices within the wider post-school system?

To answer these questions, the research team engaged in transect walks, in-depth interviews and documentary analysis of three aspects of the skills spectrum at the SASA. The analysis was framed by a curriculum-response model that recognised that responsiveness needs to be understood as a complex interaction between a range of factors that take into account industry needs, innovations in the field of knowledge production, student needs (which include cultural, socio-economic and epistemic access issues), wider societal needs and policy requirements.

It emerged that, under its different entities, the SASA is involved in the training of scientists for the sugar industry, in agricultural training and in engineering. The SASRI is the leading producer of new and applied knowledge for the sugar industry and has an international reputation for the quality of its research. In order to ensure an ongoing supply of high-quality scientists (and their support technicians) for the industry, the SASRI offers an extensive workplace internship programme that recruits graduates from South Africa's research universities and from universities of technology, as well as a graduate-training programme where masters,

doctoral and postdoctoral students are supported in the course of their studies.

In terms of agricultural training, the SASA has three broad strands of agricultural education: the SASRI offers two certificate courses, namely the Junior Certificate and the Senior Certificate; the STC's agricultural-training division offers a wide range of short courses and unit standards-based skills courses; and the third strand comprises extension services offered directly to farmers and their workers on farms. The case study data revealed that staff development within the SASRI not only improves performance in a specific job, but also opens up possibilities for progression to other jobs. Employability is thus enhanced within the organisation and beyond. In addition to this, the SASA, through the STC, offers a wide range of courses that cater for a range of different needs in the sector, such as Crane Operator (Training), Applied Business Management, Business Orientation, Learner Driver Licence (all codes) and Junior Supervisor Training.

The final strand of training that is offered under the auspices of the SASA is the training of artisans in the engineering fields. The STC was established in the 1970s largely to service the needs of the millers and has widened its scope to provide training for other entities outside the sugar industry, including the public sector. Essentially, the STC is a private technical and vocational education and training (TVET) college that is accredited by the Agricultural Sector Education and Training Authority (AgriSETA) to offer programmes that lead to 12 different trade tests. The approach taken by the STC is in essence a model involving continuous training and assessment until a student is able to complete a task. In this way, the STC is confident that, when students take the trade test, they are able to perform all the tasks.

A close relationship exists with employers, and 95% of all students are already employed or indentured; hence there is no difficulty in students accessing workplaces. Through structured interaction with companies and with work-based mentors, the curriculum is modified and adjusted on an ongoing basis within the constraints of the nationally

prescribed curriculum. The role of the mentors thus becomes critical to the success of the training model. The difficulty that the STC faces is that it cannot determine who the mentors are, and this can have a serious effect on the overall quality of the process.

There are a number of ways in which the sugar industry and its training programmes can be regarded as being responsive, particularly in relation to the curriculum. The approach taken to the curriculum within the Labour Market Intelligence Partnership's (LMIP) Theme 4 Project 2 has been deliberately broad in order to capture the multiple ways in which the educational pathway of a student can be influenced and supported.

The sugar industry is somewhat unusual in that it is so well coordinated. In addition, given that the key training providers are located within the industry, there are many opportunities for interaction between the domains of knowledge production, education and workplaces. Thus, the ability of education programmes to be responsive to the needs of the industry is facilitated by the regular, formal and informal interactions within the system between extension officers, farmers, scientists, trainers, etc., as well as millers and trainers. Not only is this theoretically possible, but the programmes are also modified as and when required.

The SASA and its substructures maintain a degree of distance from official curriculum policy. Where accreditation is required and it benefits the student or the organisation, this is complied with, but, where this is perceived to be of no value, the organisation does not slavishly comply. Even where programmes follow national curricula, there is space to innovate and add to the programmes. Curriculum as policy is thus regarded as a minimum requirement rather than a blueprint to be followed. This gives students completing these programmes a comparative advantage and improves employability.

The SASA's understanding of the high-end, skills-supply system is that industry-specific training is the responsibility of the industry. Thus there is no narrow expectation that graduates from public universities should be prepared for the specifics of

the sugar industry. There is thus a clear understanding that the curriculum for preparing new scientists is an industry responsibility, and this is also the view of the trainers in the engineering component. Producing an employable person is clearly a joint responsibility of the education institution (whether within the SASA or externally) and the industry itself.

## **Case studies 3 and 4: Forestry education in South Africa**

### **Introduction**

The forestry industry plays a critical role in many spheres of South African society. Its role in job creation, especially in the rural regions, and its contribution to economic growth cannot be underestimated. Although aggregate data shows that the forestry sector contributes 1% to gross domestic product (GDP) at national level, at the provincial level it accounts for up to 4.4% of GDP in KwaZulu-Natal and 3.7% in Mpumalanga (Department of Communications 2014). South African forestry resources, which cover about 40 million hectares of land, provide 165 900 direct jobs and provide a livelihood for 652 000 South African rural inhabitants. This stems from different forestry products, which include non-timber ones such as honey, herbal medicines, flowers and fruit. Downstream, forestry employs and supports many industries such as construction, pulp and paper, and the wholesaling and retailing of timber products. Ecologically, forests play an important role in balancing the natural cycles of carbon and water.

Forestry plantations have some negative environmental consequences particularly associated with their monocultivar nature. For instance, there are concerns about the environmental impact of plantations on soil, water use, invasive aliens, indigenous forests, etc. Such issues have a bearing on the curriculum insofar as they may be socially responsive, but are not something about which the industry is particularly concerned. Notwithstanding this, plantations act as carbon sinks, as their carbon-sequestration ability reduces the amount of greenhouse gases in the atmosphere, thereby reducing global warming. Realising the importance of the forestry sector, the Department of Agriculture,

Forestry and Fisheries (DAFF) intends to increase the forested area, which currently covers 1.27 million hectares, by 10 000 hectares each year and, in conjunction with the relevant departments, to fast-track afforestation licensing in KwaZulu-Natal and the Eastern Cape (Department of Communications 2014). This has direct implications for education and skills development in the forestry sector.

### **Forestry education and training in South Africa**

The provision of education and training (E&T) for the forestry sector is a shared responsibility of education providers, employers and government through the Fibre Processing and Manufacturing Sector Education and Training Authority (FP&M SETA). Stellenbosch University, in the Western Cape province, offers degrees in various fields of forestry at the bachelor, masters and doctoral level. The focus of such degrees is mainly management of, and research skills in, commercial forestry. The University of Venda, in Limpopo province, also offers degrees in forestry. In order to provide middle-level and low-level skills, the Nelson Mandela Metropolitan University, through the George Campus: Saasveld, offers diplomas and a few degrees in different fields of forestry. Also, in the Eastern Cape province, the Fort Cox College of Agriculture and Forestry offers a three-year general diploma in forestry that is pegged at National Qualification Framework (NQF) Level 6.

With regard to skills training, there are various industry-based, industry-sponsored and in-house training centres (Department of Communications 2014). A significant number of students are sponsored by employers to study in the aforementioned four forestry institutions. The FP&M SETA, which was established in 2011, plays a pivotal role in the provision of skills development in the forestry industry, among others. It offers forestry bursaries to students who wish to study, or who are studying, forestry-related fields (FP&M SETA 2014). The FP&M SETA also supports forestry students who are on industrial attachment by providing monthly stipends.

Given this background, it is important to understand the factors that impact on the forestry curriculum.

Critical questions regarding the determinants of a forestry curriculum need to be asked in order to gain insights into issues of curriculum responsiveness. For instance: What determines the content selection of a forestry curriculum? In which ways are forestry education and training enabled or constrained in their efforts to produce graduates and diplomates who are work-ready? How do forestry employers perceive the graduates from forestry-training institutions in terms of employability attributes? Such are the questions that the next two case studies explore. The first case study investigated forestry education that is offered at the George Campus: Saasveld of the Nelson Mandela Metropolitan University, while the second one is based on the data that were collected at the Department of Forestry and Wood Sciences at Stellenbosch University. In both case studies, additional data from the industry were gleaned through interviews with key informants from FSA.

### **Case study 3: Developing skills and competencies for the forestry industry: A case study of curriculum responsiveness in a South African comprehensive university**

#### **Introduction**

The case study commences with a brief overview of the context of forestry training at the George Campus: Saasveld of the Nelson Mandela Metropolitan University (NMMU) before presenting some issues of curriculum responsiveness, as viewed by academics and students. Then such views are analysed, using a curriculum-responsiveness theoretical framework developed by drawing on the works of Moll (2008), Young and Wheelahan (2010b), Sen (1999) and others. The case study ends with some recommendations for improving curriculum processes.

On its website, Saasveld claims that it offers qualifications in forestry and wood technology that are informed by the needs and standards of the industry. Its diplomates and graduates are sought-after by the industry, locally and globally. In the next section, we outline our understanding of curriculum responsiveness at the NMMU School of Natural Resources Management.

The NMMU George Campus, where Saasveld is located, offers the National Certificate in forestry-related fields. After two years of theoretical learning and one of industrial attachment, students are awarded a National Diploma. After the diploma, students can enrol for a Bachelor of Technology in Forestry or Wood Technology and complete this degree after one additional year. Beyond this, Saasveld offers forestry-related masters and doctoral degrees. Other forestry-related qualifications offered by the NMMU at Saasveld are Veldfire Management, Wood Technology, Agricultural Management, and Nature Conservation and Management.

### Findings

The curriculum at Saasveld is informed by the needs of the industry. It emerged from the interviews with the academics that, in most cases, their curriculum is influenced by the dynamics of the industry, which is, in turn, moulded by global trends. The academics' close interaction with their advisory board and FSA keeps them up to date with what transpires in the industry. The Director of the School of Natural Resources Management conceded that failure to keep pace with trends in the industry would render their teaching irrelevant. Such changes in the forestry industry have been the driver behind the profitability of most forestry establishments. This has meant that the forestry curriculum has needed to be transformed.

Saasveld introduced a Higher Certificate in Veldfire Management at the request of the industry. The programme, which is offered over a one-year period, or two years if pursued as block release, responds to the need for fire experts, not only in the forestry industry, but also in other sectors such as agriculture, transport and legal services. Because of the positive responses from the industry, Saasveld will develop this certificate into a diploma.

Interviews with experts and leaders from the industry revealed that the narrow focus on technical forestry skills needs to shift towards a more multifocal approach that embraces the need for the development of 'soft' and often transferrable skills such as negotiation, presentation and communication skills.

While there is a formal curriculum at Saasveld, there is considerable room for academics to include or determine pedagogy and modes of delivery. Some academics who were interviewed argued that their considerable, lengthy experience contributes significantly to their content and method of teaching. This is aided by their professional networks at national and international level.

The standardisation and quality assurance of the forestry qualifications at Saasveld are as follows: the qualifications are quality-assured by the South African Qualifications Authority (SAQA) and by the Council on Higher Education, and there is internal quality assurance within the university. The SAQA determines the exit-level outcomes for each programme. The publication of the revised Higher Education Qualifications Sub-Framework (HEQSF) showed the need for the realignment of Saasveld qualifications with the new qualification framework. One instance in which the School of Natural Resources Management is responding to the revised HEQSF is to change its BTech in Forestry to an Advanced Diploma in Forestry. Although the BTech was a highly sought-after qualification among employees in middle management, the School of Natural Resources Management and the forestry programmes had to phase out the BTech and replace it with an Advanced Diploma, because, based on the revised framework, the current offering best aligns with this type.

Like most programmes that require Mathematics and Physical Sciences, the forestry programmes at Saasveld face stiff competition in attracting forestry students. The problem is made worse by negative perceptions and, in certain cases, by lack of awareness of the forestry profession. The School of Natural Resources Management is forced to take students with barely the minimum requirements, or less. To make up for this, the School introduced an extended programme. Notwithstanding this, attrition rates, which are approximately 30% to 40%, are fairly high.

Not only has student demand for forestry programmes increased, but gender patterns have also changed. Historically, most – and, at times, all – of the students were males. However, this trend has changed and the new intakes to the forestry

programmes range from 40% to 50% females. The School also receives far more applications than it can accommodate.

Mandatory work-based learning with credits is one of the major components of all programmes for all forestry qualifications at Saasveld. Students engaged in theoretical learning for one year are expected to go on to an industrial attachment for one year. In the years past, this has run smoothly. However, academics and representatives from the industry noted that work placement was becoming increasingly problematic. This is a matter discussed in more detail below. Together with theoretical learning, work-based learning may be one of the reasons why graduates from Saasveld are perceived very favourably by employers.

According to Forestry South Africa, over 60% of commercial forestry plantations are subject to land claims. Such claims can alter the architecture of land ownership, which may result in the subdivision of large plantations. Some experts believe that this may require different sets of skills from forestry graduates. Forestry education providers must therefore prepare for such changes.

This case study shows that the forestry profession is not known by most students in the spheres of primary and secondary education. Certain students did not know about forestry before they enrolled for it, while some grew up with family members who were in forestry.

The Saasveld forestry programmes endeavour to produce holistic graduates with hard and transferable skills. The curriculum includes other subjects that are not narrowly focused on forestry production. Modules in Human Resources Management, Statistics, and others, are offered. Also offered are driver's licence lessons for forestry students.

There are various factors that enable or inhibit learning at Saasveld. The widely used e-learning in the form of Moodle, E-pal (an online facilitator), and a well-resourced library support learning. However, the issue of limited funding and overreliance on industry bursaries may hinder progression. For

instance, some companies do not allow the students they fund to continue with their studies before serving them. The increase in the number of students who are enrolling for forestry qualifications is causing anxiety among students, who think that the industry is too small to absorb the graduates.

Among other things, the case study demonstrates the influence of industry with regard to the curriculum processes of forestry education at Saasveld. Viewed positively, this can be seen as one of the most important ways of equipping forestry graduates with the relevant attributes that will make them work-ready. The forestry industry, which is well coordinated under Forestry South Africa, is also involved financially through the awarding of bursaries to some students.

#### **Case study 4: The growing of skills for the forestry profession: A case study of curriculum responsiveness in a South African research university**

This section commences with a brief overview of the context of forestry training in the Department of Forest and Wood Science (DFWS) at Stellenbosch University before presenting some issues of curriculum responsiveness, as viewed by academics and students. The case study ends with some recommendations for improving curriculum processes.

The DFWS, which was established in 1932, is one of the oldest forestry-education providers in the country. Before the restructuring at Stellenbosch University, it used to be the Faculty of Forestry. After its merger with the Faculty of Agriculture in 2006, it became the Faculty of AgriSciences. Together with the Faculty of AgriSciences, the Faculty under which it falls, the DFWS claims that it has developed and maintained a reputation of being one of the best forestry-education providers in Africa. Since its establishment in 1932, it has awarded more than 890 BSc, 210 MSc, 42 PhD and 11 DSc degrees (Department of Forest and Wood Science 2013: 1). At undergraduate level, it offers a BSc in Forestry (BScFor) degree in Forest and Natural Resource Management and Wood Products Science. The DFWS attracts self- and company-sponsored

students from across the country. At undergraduate level, the racial distribution of students is almost 50% black and 50% white. Although this may not reflect national demographics, it is a significant change for an institution that used to serve a predominantly white student community.

The DFWS interacts with national and international forestry-related organisations and individuals. Its academics participate in international and regional workshops and conferences at which knowledge on forestry is shared and disseminated.

The DFWS interacts with a broad spectrum of stakeholders. Such stakeholders include the industry, which employs the DFWS's graduates. Industry participation in the annual advisory council meetings presents an opportunity for academics to gain a sense of the needs of the industry as regards both skills and graduate attributes. To a great extent, the DFWS tries to align the curriculum with the needs of the industry based on its direct involvement in research and development. However, because the academics in the DFWS are involved in high-level research, both at national and international level, they are often the ones who inform the industry about the current trends in, and needs of, the forestry industry and thus do not simply respond to employer demands.

There are internal and external quality-assurance mechanisms for the programmes offered by the DFWS. Although the SAQA and the Higher Education Quality Committee (HEQC), as well as internal quality-assurance structures, do not stipulate the content of the forestry curriculum, they do require specification of the exit-level outcomes for proposed programmes. The publication of the revised HEQSF foregrounded the need for the realignment of Stellenbosch University's qualifications with the new qualification framework.

The dearth of matriculants with sound science and mathematical literacy and competition with other disciplines for such students have an influence on the DFWS. This issue spawns a multiplicity of other challenges and different responses, such as the extended development programmes where the students' first-year workload is spread over two years.

Unlike other institutions offering vocationally oriented qualifications, the DFWS does not have a mandatory, work-based learning component with credits. Students can, on their own and during vacations, seek work experience with any company of their choice, but the DFWS is not involved in this. What it needs, though, is a letter from the companies concerned to confirm that the students were working for them during the vacation.

Academics at the DFWS are satisfied with the industry perception of their graduates. They noted that their students are sought after throughout the world. They stressed that this is as a result of close cooperation between the DFWS and the industry and because of their experience, which gives them insights into which topics the industry might need to be covered.

One of the greatest obstacles the DFWS is facing is the recruitment of academic staff. This is worsened by two factors that are interrelated. The first one is equity policies, which require the employment of black South Africans. Moreover, most graduates from this group are offered salaries by the industry that are higher than those that the university can offer. This competition for graduates is the second problem, and also affects people of other races. The DFWS had an open post for more than a year, which it was struggling to fill.

How students became aware of the forestry profession and made the choice to pursue it shows lack of awareness of the profession on the part of students. There was no common reason why students chose to pursue qualifications in forestry. Among undergraduates, reasons included: 'It seemed interesting'; 'My father was a forester'; 'I grew up near forests'; and 'I got a bursary'.

In order to reduce student attrition rates and improve throughput rates, Stellenbosch University has a First-Year Academic Programme (FYA) that is designed to address the 'culture shock' that often challenges first-year students. The FYA has a number of well-coordinated activities that are designed to help the first-year students.

However, there are some curricular and non-curricular challenges that may inhibit learning. The

computers within the DFWS were reported to be 'behind the times'. Further, although English is the medium of instruction in the DFWS, some modules offered in other departments are delivered in Afrikaans.<sup>4</sup> This could be a challenge for forestry and wood science students where the bulk (51%) of modules are taught in the Faculty of Engineering. Such students are assisted through translation or the same module may be taught in English. The DFWS does, however, help Afrikaans students to understand English terms.

The DFWS case study has demonstrated that the influence of the industry on the curriculum processes of forestry education is not without its limits. This was not viewed in a negative way, and the DFWS was seen to be playing a proactive role in equipping forestry graduates with the relevant attributes that would make them work-ready and informed as a result of collaborative scientific research and the wealth of experience of lecturers in the profession. Indeed, the academic leaders of the programme argued that the expertise residing within the DFWS means that they engage with the industry as equal partners and are not dictated to by industry representatives.

## **Case study 5: The National Certificate (Vocational) in Automotive Repair and Maintenance: A case study of the curriculum as reflected in the subject and assessment guidelines for TVET colleges**

### **Introduction**

In this case study, the curriculum of an automotive repair and maintenance qualification is analysed to see what potential there is for responsiveness and for enhancing employability.

The National Certificate (Vocational) (NCV) curriculum was circulated after a comparatively short development phase in 2006 and subsequently made operational in January 2007. The main aim of the NCV qualification is to equip students with broad theoretical knowledge, practical skills, and

understanding in order that they may enter a range of occupations associated with the field and thereafter apply what they have learnt, in the workplace. It is also intended to prepare students for further study, as it is deemed to be an equivalent of the National Senior Certificate. The NCV is thus intended to integrate practical knowledge (how to do things) and propositional knowledge (facts), with significant time being allocated to practical activities. The reality of the curriculum load and the limited space for practical teaching in many colleges, as well as the external assessment requirements, have resulted in very few of the practical components being taken seriously. These difficulties, alongside a lack of employer understanding of the purpose of the NCV, have led to low levels of trust in the qualification and to a series of curriculum reforms and reviews over time.

In this case study, the following question was addressed: What is the relationship between propositional knowledge and practical knowledge in the curriculum for the NCV in Automotive Repair and Maintenance, that is, between the subject and assessment guidelines for Automotive Repair and Maintenance Level 2?

### **Approach**

The case study employed a comprehensive analysis of curriculum documents. Firstly, a curriculum analysis of the SAG for the NCV ARM was carried out. The primary focus of this analysis was propositional and practical knowledge within the official curriculum. An analysis of the NCV ARM Level 2 curriculum document was then conducted. The purpose of this analysis was to determine whether the curriculum leans more towards propositional knowledge or practical knowledge, and to ascertain the relationship between propositional knowledge and practical knowledge in the curriculum. Predetermined categories were used to categorise the data. The categories were then counted and the findings expressed in terms of quantitative data. The SAG were analysed by using each sentence as a unit of analysis. The coding was carefully prepared on an Excel spreadsheet. There were three categories used to analyse the intended curriculum: theoretical knowledge, practical knowledge and work-process knowledge. This

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<sup>4</sup> This research was conducted before the finalisation of the university's language policy that makes English the medium of instruction.

analysis was quantitative, in that the number of sentences in each category was counted.

### **Main findings in respect of the analysis of LOs**

When the LOs in respect of the SAG for the NCV were analysed, the following question was taken into account: What is the relationship between propositional knowledge and practical knowledge in the curriculum for the NCV ARM, that is, the SAG for ARM Level 2?

It was identified that there were 12 topics contained in the SAG. Those topics were broken down into subject outcomes (SOs), LOs and assessment standards (ASs). This analysis focused on the LOs and the relationship between propositional/theoretical knowledge and practical knowledge.

The LOs were analysed according to three categories: propositional knowledge, practical knowledge, and work-process knowledge. The analysis showed that seven of the 12 topics were dominated by propositional knowledge, that three of the 12 topics were dominated by practical knowledge, and that just two of the 12 topics were work-process knowledge, that is, knowledge directly related to the holistic understanding of the full set of work-related activities (see Rauner 2005).

The topics that dominated in theoretical knowledge were as follows: Topic One: Health and Safety; Topic Three: Measuring Equipment; Topic Five: Fundamentals of Engine Technology; Topic Six: Bearings; Topic Eight: Lubrication Systems; Topic Nine: Wheels and Tyres; and Topic Ten: Cooling Systems. Theoretical knowledge was identified by words such as 'describe', 'explain', 'outline', etc.

The topics that dominated in practical knowledge were as follows: Topic Four: Vehicle Lifting Equipment; Topic Eleven: Lights and Auto Electrical Systems; and Topic Twelve: Servicing a Vehicle. Practical knowledge was identified by words such as 'clean', 'test', 'store', 'carry out', etc.

The topics that dominated in work-process knowledge were as follows: Topic Two: Tools Applicable to Automotive Trade; and Topic Seven: Batteries. Work-process knowledge was identified

by words such as 'apply', 'demonstrate', 'identify and use', etc.

It has been suggested that most learning programmes do provide students with propositional knowledge or foundational competence. However, within the context of applied competence, such programmes should also offer students opportunities to gain practical competence, not only in controlled and defined environments, but also outside the safety of the classroom and laboratory, in real-world contexts, where they will be required to adapt and recontextualise their learning so as to function successfully in complex and unpredictable circumstances (SAQA 2000).

According to Young (2008), the vocational curriculum needs to be controlled by key stakeholders, that is, employers, and not by the training centre, that is, the further education and training (FET) colleges. The previous SAG that existed in respect of the vocational curriculum was based on bodies of knowledge. This outdated SAG needed to be revised and updated to keep up with the industry. It was perceived as stressing what students needed to know (theoretical knowledge) and not paying enough attention to what they would need to do when they were at work (work-process knowledge).

Although the curriculum was revised and the new SAG for Level 2 was implemented in 2013, very little has changed in terms of content from the 'old' SAG to the revised SAG. On the basis of the analysis above of the LOs of the 12 topics provided in the SAG, the evidence is clear that, although the curriculum has been revised, the theoretical knowledge dominates the practical knowledge by 17%. The concept of work-process knowledge is unfortunately largely absent, making up only 7% of the LOs.

The relationship between theoretical knowledge and practical knowledge is one that needs to be worked on further in order to enhance the programme so that it becomes more aligned to the work process. In 2006, it was clearly stated:

*The NCV ... will provide learning experiences in situations contextually relevant to the*

*particular vocational area in which the programme is situated. The NCV ... will offer programmes that will consist of the academic and theoretical knowledge integrated with the practical skills/knowledge and values specific to each vocational area.* (Department of Education 2006: 12)

However, the above does not echo this sentiment but rather shows that, in comparison with practical knowledge, theoretical knowledge in many instances dominates what is offered by way of the curriculum. What should also be noted is that, in most cases, as identified above, there were very few instances where work-process knowledge played a role in the LOs.

Additional interviews with unqualified mechanics and small and medium-sized firms' employers indicated no knowledge of the qualification or interest in pursuing the qualification as a route to further qualification or recruitment.

## **Case study 6: Artisan competence: A case study of curriculum responsiveness in two firms**

### **Introduction**

This case study interrogates the relationship that exists between competence and curriculum within South Africa's TVET sector. The two institutions profiled in this case study are a leading motor manufacturer's learning academy ('MMSA') and, as a contrast, a South African steel producer's engineering academy ('SSA'). These two institutions are leading in their respective sectors when it comes to market share, participation in various policy forums, as well as intake of students into their training programmes. Moreover, they are continuously engaging with the Manufacturing, Engineering and Related Services Sector Education and Training Authority (merSETA), and they participate in many of the teaching and learning innovations instituted by the SETA, such as the Accelerated Artisan Training Programme. The case study used a competence benchmarking test (COMET) in order to gauge the quality of the relevant qualifications on an international level as well as track the development of individual apprentices

within the system. COMET, a form of Large Scale Competence Diagnostics (LS-CD) in TVET, is designed as an instrument for assuring and developing quality. While the overall results were very poor, there were a few individuals who performed better and these were clustered in the two institutions selected. The case study thus sought to examine whether the delivered curriculum (its sequencing, pacing and structure) might account for the above-average performance in the COMET test. Despite the better profile, in both selected institutions (the SSA and the MMSA), approximately 70% of the students who participated in the COMET study were ranked at the nominal-competence level. This level of competence is described as having a theoretical understanding of the subject without the practical application. This means that the majority of students were not able to attain the lowest level of competence stipulated by the COMET model.

### **Findings**

#### **'Steel South Africa (SSA)'**

SSA's engineering academy runs a number of training programmes, of which the engineering apprenticeship is the most popular. Apprenticeships are offered in a number of occupations, such as boilermaker, welder, electromechanic (millwright) and electrical engineer (Company website 2014). The apprenticeship runs from a minimum of 80 weeks to a maximum of four years, but the sequencing and pacing of the curriculum are not rigidly aligned to the structure of modules and courses on the NQF. As with most merSETA-accredited institutions, SSA's engineering academy course material is prescribed and quality-assured by the merSETA.

Beyond offering merSETA-accredited courses, the academy also provides skills programmes that are intended continuously to upskill the company's existing workforce. The organisation's dual role as employer and training provider places it in an ideal position as far as curriculum responsiveness is concerned. At the institutional level, the academy has the capacity and expertise to identify the gaps in the skills profile of the organisation and to offer the necessary programmes to close these gaps.

In order to improve success rates, mentors and coaches are allocated to all successful applicants.

The coaches, who are subject-matter experts, are allocated to help the students fit in at the plant, where they will be working with teams of artisans and technicians. The coaches provide day-to-day support and have regular (weekly) follow-up and feedback sessions to ensure a high level of work performance. The mentors are responsible for academic and personal guidance of students.

### ***'Motor Manufacturing South Africa (MMSA)'***

The MMSA learning academy provides advanced training for its employees, as well as business-training services for local suppliers and businesses. The academy has five units. Each unit specialises in one of the following: production, leadership, technical, commercial, and sales and marketing. The units are supported by a learner-management system that is in line with the latest technological developments.

As regards quality assurance, the MMSA's learning academy is accredited by the merSETA and the training programmes on offer are aligned with SAQA requirements and the NQF.<sup>5</sup>

Owing to limited space and high student demand for the programmes, the academy has strict entry requirements and complex selection criteria. Students who qualify are further screened through psychometric assessments and individual interviews.

The curriculum at each level is divided into three components: core, fundamentals and electives. Students are required to undergo upfront institutional training (theoretical instruction) in their occupational field. They attend classes five times a week. Over and above that, students gain workplace-learning experience with different amounts of exposure at each level. At Level 2,

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<sup>5</sup> It is useful to note that public TVET colleges also offer learnerships, but they have to bid competitively for learnerships and these are not necessarily renewed and do not lead to progression. TVET colleges also usually outsource their theoretical learning to consultants through time-bound contracts, which does not build public TVET capacity (as they cannot 'double-dip' by using establishment staff). The MMSA as an industry provider appears to have its training programmes linked to progression and career pathways for artisanship. This is not currently possible for public TVET colleges.

students are given 20% exposure, at Level 3, 50% exposure, and at Level 4, 75% exposure. At the end of Level 4, students complete a ten-week training course to prepare them for the trade test.

A learning and development forum has been established at the learning academy to provide support and to induct students into the culture of the organisation, as well as help them with the transition to the work environment. This forum meets every two weeks to discuss teaching and learning, as well as student-related matters. Each cohort of students at the academy is assigned a mentor and a work supervisor.

## **Case study 7: Corporate engagement: A case study of curriculum responsiveness in a manufacturing-company training programme**

### **Introduction**

This case study provides a firm-level perspective on the entire education system and the specific skills 'pipeline' with which the firm needs to engage. In so doing, the case study illuminates the complex interactions between firm, community and education system that produce employable individuals.

In the discourse on skills development in South Africa, there is a recurring tension. On the one hand, commerce and industry claim that the products (graduates) of the education system are inadequately prepared for the world of work, and, consequently, that commerce and industry have to do significant retraining and upskilling of graduates. On the other, education providers point out that there is widespread reluctance on the part of employers to provide work-experience opportunities, and that employers do not generally interact with education providers about issues relating to the curriculum. There are, however, exceptions to this general picture, and this case study focuses on a firm, Bell Equipment, that is actively involved in training, that interacts with education institutions, and that has not reduced its focus on education and training during periods of economic downturn. Bell Equipment is a key regional role player in the South African

manufacturing, automotive and heavy-equipment sector.

### **Firm-level analysis**

Bell Equipment conducts a significant amount of training itself, working within the parameters of the national education and training system. In this respect, it is an E&T provider. As a company, it also recruits the graduates of the public-education system, both as employees and into its training programmes. In this regard, Bell needs its own curriculum in order to be responsive to a variety of factors, and it is interested in the degree to which education providers are responsive to its own needs. In general, the ability of Bell Equipment to respond to multiple drivers of curriculum change and labour demand results in a set of circumstances that could point to a model of best practice, although this would be difficult to replicate in any expansive way across a national system. However, principles that could be applied in different contexts emerge from the study.

The major theme emerging from this case study is that Bell's approach to skills delivery for its manufacturing plant, and for the servicing of its products in the field, is underpinned by a long-term vision of training needs and responsiveness driven by a dedicated team of in-company 'training champions'. This case study gives a brief narrative of the company's training vision, structure and role players. The first part of the case study is based on interviews and conversations conducted with the senior training director and champion-managers of four training divisions during a weeklong, on-site observation period in April 2014 at the manufacturing plant in Richards Bay. The second part is based on one-on-one interviews with seven young men and women enrolled for Bell's training.

One of the stated objectives of Bell Equipment is the provision of sustainable employment, particularly for local inhabitants. This is attributed to the vision of the founder, Irvin Bell. The need to secure work and to sustain work is the firm's number-one responsibility in terms of corporate social investment. The firm draws its artisan labour 'feedstock' from within a 50-kilometre radius of Richards Bay. Bell also prefers to keep its wider

training spend in the community. Broad, generic corporate training is outsourced to local providers 'that have walked a long road with us, that have been ingratiated to the Bell culture', rather than sending employees to other regions.

There are two legal entities comprising Bell Equipment: Bell Equipment and Sales South Africa (BESSA), which is located in Gauteng, and Bell Equipment Company South Africa (BECSA), which is located in Richards Bay. BESSA is geared toward sales of Bell products and providing after-sales support to clients. Training therefore focuses on these objectives. BECSA is the manufacturing site and its training system focuses, in a variety of ways, on skills provision for the production plant. These two entities are headed up by different training managers. BECSA Training has six apprenticeship courses, namely fitting and turning, fitting, turning, boilermaking, electrical, and auto electrical, while BESSA Training focuses on training clients in Bell products and on providing Earthmoving Equipment Apprentice Training (EMEAT).

As regards curriculum responsiveness, it was identified that the quality of artisans graduating from the EMEAT was falling short of the required standard. As a result, industry became involved in designing the trade-theory part of three qualification curricula for mechanics: light, medium and heavy. Apart from the training that takes place at Bell, the firm is also involved in designing curriculum content for delivery at TVET colleges.

Bell has training champions whose roles centre on people development and skill supply. There are four training champions whose job it is to identify artisan mentors to whom students are apprenticed. The EMEAT, for example, relies heavily on mentors to coach apprentices to artisan status.

Bell has developed strategic partnerships and has implemented various interventions across the education trajectory. These partnerships are to be found across five identified levels of the education system, namely: early childhood development (ECD), schools, TVET colleges, universities of technology, and universities. At ECD partnership level, Bell partners with the isiZulu Orphan Project

by educating, feeding and supporting rural South African orphans as well as the children of HIV-positive widows. At school strategic-partnership level, Bell provides funding in the form of bursaries for needy students. Possibly the most important and effective partnership – in terms of skills development – is Bell's involvement in TVET colleges in the region. For instance, Bell is involved with a number of TVET colleges that offer the NCV Electrical Infrastructure and Construction (EIC) and Engineering and Related Design (ERD) and that are accredited trade-test centres. Bell also partners with both Mangosuthu University of Technology (MUT) and the Durban University of Technology (DUT) in providing opportunities for National Diploma candidates to do the work-integrated learning (WIL) component of their qualification at Bell. Lastly, Bell offers a graduate-training programme that works with BSc Mechanical Engineering graduates from around the country.

The aim of the second part of the case study is to show that an exploration of curriculum responsiveness and employability needs to be understood as responsiveness to a range of contextual factors such as socio-economic and/or spatial constraints on access to E&T. It shows what happens when relevant actors across the system partner effectively with each other so that the lives

of individuals might be changed and their employability and future prospects for development and prosperity potentially enhanced. While the accounts are largely positive, it is important to note that there were a few counter-narratives where students were not satisfied with their prospects within the firm.

### **Conclusion**

This initial investigation into Bell's E&T tells an inspiring story with one simple theme: where people are committed and determined to succeed, E&T can deliver on the ideal of improved quality of life for people and of providing labour with the relevant skills. Where the story gets complicated is that Bell is a closed, tightly integrated and resource-rich organisation. Clearly a national education system is none of these. But the story does strongly point to the need for higher education institutions and other training institutions, and key industry players across different sectors, to work closely together with other relevant stakeholders such as SETAs, non-governmental organisations (NGOs), and occupational and professional bodies. In particular, strategies for appointing, training and retaining champions to drive E&T in discretely identified sectors should be pursued in order to ensure that training is responsive and results in employable individuals.

## 3. ANALYSIS

The syncretic analysis of the seven case studies, supplemented by additional data in some instances, is presented below. Firstly, following the logic of the discussion about drivers of responsiveness, some cross-cutting issues related to employers, students, policies, social and environmental factors, and institutional levels are discussed. Thereafter, the issue of employability is discussed, followed by some broad cross-cutting themes. This is followed by a section that highlights the policy implications specifically for skills planning.

### Responsiveness

#### Employers

The critique of education institutions and the curriculum often suggests that employers are of one mind when it comes to matters of employability and the failings of the system. The case studies suggest that employers are heterogeneous in their thinking about education and training (E&T). There was consensus that the basic education system was a major stumbling block for developing a good post-school system, but how they engaged with the system to address their skills needs varied greatly. There was general acceptance that employers had to train employees regardless of their qualifications, but some saw this as a failing on the part of the education system, while others saw this as an inevitable function that only they themselves could perform. All employers interviewed, be they small panel beaters, or multinational manufacturers, or research organisations, indicated that they trained out of necessity and that they paid for this training over and above incentive schemes such as the skills levy.

In a number of cases, there was a productive relationship between employers and education institutions that resulted in curriculum innovation through communication. Usually, this was through formalised structures, which raised the question as to who spoke for the employers in that forum. Industry representative structures or professional bodies may not always represent the specific needs of particular employers and thus there is always a degree of tension as to who precisely should be listened to. Education providers articulated some frustration in this regard.

What appears critical, perhaps more than the actual content covered, is the degree of trust placed in specific programmes or providers. Many employers indicated that they recruited people from specific institutions largely on the basis of historical precedent. This is a critical issue for new institutions or institutions offering new programmes: a good curriculum is not a sufficient criterion for the recognition of programmes by employers.

There was a widespread but relatively non-specific concern expressed regarding various issues normally associated with 'soft' skills. New graduates were seen as not fitting in, and as being too demanding of benefits, promotion and salary without 'going the hard yards' first. Communication and social skills were also considered problematic, especially accurate writing. While this was identified as a problem, there was also acknowledgement that the post-school institutions should, and could, address these issues in the curriculum. Socialisation into the world of work was deemed to be an ongoing challenge. This has been widely corroborated by local and international research

(see, for example, Shury et al. 2014). It is this employer view that tends to focus the discussion concerning employability on the individual characteristics of students and obscure the other dimensions of employability.

Overall, the view employers had of education institutions varied significantly, dependent on the degree of engagement. The more closely the employers worked with education providers, the more positive their view of institutions and their programmes and the greater the understanding of the constraints that providers faced. Generally, in-house provision (including industry-level provision) was viewed as being more responsive and focused on the specific needs of the employer, while public providers were viewed as being more removed from the employers and thus less responsive. However, there were a number of examples where public providers were viewed very positively.

### **Students/workers/job-seekers**

The degree to which an institution, the programme and its curriculum responds to the needs of students varied across the cases. In some cases, we did not have much data on support at the classroom level and were only able to reflect on students' concerns and accounts. However, there was widespread awareness among the teaching staff that they needed to take account of the needs of the students at various levels.

A number of the programmes provided a range of support for students. University of Technology (UoT) students singled out individual lecturers who 'cared' as creating an environment in which they wanted to succeed. Programmes with extended curriculum options and various forms of support were in place in the formal university settings, while some employers provided accommodation and other material support to enable students to study and, critically, also be inducted into the organisation through mentors, and so forth. All the educators interviewed expressed concerns about their individual, collective and institutional capacity to be responsive to the students' needs. Specifically, the learning support that some students required (usually understood as a consequence of poor basic education) posed significant challenges to the

curriculum. There was concern about how to balance the stated outcomes for particular courses and programmes with the level that people entered programmes. Being more selective was often not an option in terms of viability and social-justice considerations and there was thus concern that programme requirements were being compromised. Resources to provide support were not readily available, especially at college level.

Not surprisingly, the socio-economic circumstances of the majority of students framed and shaped their study experience. Trying to secure sufficient funds to pay fees and living expenses while studying was a serious challenge and students described having to sleep in the streets whilst waiting to register, and being hungry in term time. Those students who were employed and/or had bursaries expressed gratitude and loyalty to their employers and bursars, but, in the case of students funded through the National Student Financial Aid Scheme (NSFAS), there was an appeal for more funds. Many of the employers assisted with policies that enabled staff to further their skills and qualifications, a benefit that the staff viewed as a major reason for remaining with the specific employer.

A significant number of the students and employees interviewed across the cases had very little commitment to their choice of career. With a few exceptions, particularly among postgraduate students, there was very little knowledge about the career path they had entered. Career guidance, or rather the lack thereof, was a major concern. Where students had made a conscious choice to follow a particular trajectory, it was usually based on limited information or on available funding sources. However, once in programmes, students who were interviewed were quick to recognise the employability potential (positive or negative) of the programme they were on and would thus seek to meliorate any restrictions by pursuing further studies or moving into other programmes. This represents a degree of wastage in the system as a whole that could be reduced through better guidance. However, it is likely that, even with good guidance, there will be a sizeable number of students who have chosen programmes erroneously. Structuring curricula that have transferable and more generic

modules in the first year would also allow students to make changes without starting from scratch.

Being responsive to students and their needs is often complementary to the needs of employers, but there are some tensions. Providing effective student support is a resource-intensive activity and there may be a push to reduce training costs on the part of employers that could see student responsiveness being undermined. In publicly funded programmes, funding for student needs in respect of the curriculum (and more broadly) can be secured through policy instruments, but the programmes that are offered on a commercial basis may prioritise students who require less support, in order to cut costs.

### **Policies and regulations**

When programmes are designed in the South African context, they are regulated at a number of levels. From the case studies, it can be seen that the role of policies was a significant factor shaping the programme. The absence of policy or the requirements of policies and regulations both had an impact on the curriculum. South Africa has relatively complex and comprehensive policies governing the nature of the programmes and regulating the delivery through various quality-assurance and registration requirements.

Three examples are illustrative. Firstly, requirements to align qualifications to the National Qualifications Framework (NQF) were seen, in at least one instance, as an inhibitor to developing a responsive curriculum. The NQF logic requires qualifications and unit standards to be pegged at a specific level and to meet certain generic criteria in terms of that level. It also defines the amount of time required in order to complete a qualification. However, work processes sometimes require a knowledge mix that spans different levels of the NQF, and the types of courses do not fit the generic descriptors of particular types of qualifications. The choices are then to force the knowledge and skills into the framework, or, in some cases, to ignore the requirements, or to opt out of the NQF entirely.

Secondly, systemic policy constraints can affect employability in terms of progression in a career. For

example, the three-subqualification framework development of qualifications, often in silos, results in a lack of articulation between qualifications.

The third example is a case where lack of policy has an impact on the curriculum and undermines a dimension that would ordinarily be regarded as being responsive. The lack of an adequate funding framework for work-integrated learning (WIL) is a case in point where programmes were being redesigned in order to remove the problem, primarily because the resourcing requirements made this initiative unviable. A related example was the nature of college lecturers' conditions of service, which made it difficult to arrange for them to spend time in workplaces, or the perennial issue of insurance for students in workplaces. In these instances, policies or their absence have a direct effect on aspects of the curriculum.

Policy also constrains the degree to which different post-school institutions are able to be responsive. The greater level of autonomy of the university subsystem enables it to be more directly responsive to the needs of industry in its curriculum development. By contrast, while colleges are called upon to be responsive, they have little leeway to develop programmes, as these are national processes and are assessed centrally. Thus, even if a college were to engage employers, they could not develop a programme that caters for a local need and be funded for that through the subsidy.

At a broader economic level, legislation such as the Sugar Act has had a direct bearing on the degree to which the industry is coordinated and therefore able to interact, while non-education policies such as environmental legislation also have a bearing on the curriculum. The curriculum thus has to respond to both education policies and wider policies associated with the economy and society.

### **Societal and environmental issues**

Responding to policies can be a matter of compliance with policy. However, there may be issues of social justice and redress that are not tightly regulated but there is an expectation that these will be addressed. For example, opening up access to women in some professions challenges

well-established workplace identities that need to be engaged with in the curriculum. Similarly, instilling ethical behaviour or environmental awareness may not always be a priority for all employers but should be understood as a social responsibility to which a curriculum must be responding. In the case studies, these wider senses of responsiveness were a common feature in the formal qualifications offered by the public providers particularly. The need to view the curriculum as being broader than instrumental training, with a sense of social responsibility and ethics being stressed in a number of cases, was at times in tension with specific work-related knowledge. However, employers generally expressed support for courses that would broaden the horizons of students' outlook and world views, but they queried whether these courses were effective.

### **Education and training organisations**

The internal dynamics and capacity of the E&T organisations have a direct bearing on the nature of the curriculum. The teachers make a difference and so do the rules and resources that operate within an organisation. Decisions made about matters such as common modules mean that curricula have to accommodate internally driven curriculum modification. At times, these may be as a response to wider pressures on the institutions from employers, but, equally, these may also be strategic responses by post-school institutions to resource models, capacity problems, and so forth. The decision to change the WIL component at UoTs is based partly on an educational concern, but primarily on the practical constraints that confront the institution.<sup>6</sup> Similarly, strategic decisions to focus on research may result in lecturers and departments shifting the focus of courses. Class sizes, access to laboratories, modes of assessment, and timing of modules are all issues that are affected by the internal dynamics within an organisation. Of course, some of these issues are also related to policies such as how institutions are funded, but the way the institution responds is not simply determined by the policy. These pressures may result in curriculum

decisions that may shift the focus away from employers' concerns to an internal prioritisation. This is an inevitable consequence of the multiple functions that many education providers perform. Thus there is always a degree of compromise about what is possible within the organisational constraints.

### **Integrating the drivers**

While it is useful to separate out the various drivers that shape responsiveness, in reality many of the above issues are interrelated. For example, responding to student needs may simultaneously serve the needs of the organisation and potentially address employers' needs as well. The different drivers are not always in tension, but they do have a distinct logic that can pull the institution and its programmes in different directions.

In the next section, the discussion turns to some of the cross-cutting insights that emerged from the synthetic analytical synthesis. We begin by examining the curriculum itself, before examining the role of partnerships and trust, occupations, and, finally, the notion of a skills ecosystem.

## **Curriculum**

The research literature on curriculum, particularly within the sociology of education, has for some time viewed curriculum in an expansive sense. 'Curriculum' is not to be narrowly reduced to a blueprint such as a syllabus, but needs to include the full gamut of learning and teaching experiences, intended and unintended, overt and covert, that students experience. This expanded view of curriculum is useful for making sense of the themes that emerge across the case studies.

For a curriculum to be responsive, we need to unpack all the different dimensions of curriculum and not look narrowly at the intended curriculum. If we define a vocational curriculum as a learning pathway that leads to a level of holistic competence in a specific occupation, then we necessarily have to divorce the understanding of curriculum from the syllabus of a specific qualification. Included in the curriculum must be an understanding of what is required in totality in order for someone to achieve

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6 Mutereko S and Wedekind V (2015) Work integrated learning for engineering qualifications: A spanner in the works? *Journal of Education and Work*, <http://dx.doi.org/10.1080/13639080.2015.1102211>

this form of competence before and after the formal qualification programme is entered into and completed. Developing this level of understanding of curriculum at the level of classroom lecturers is not likely to be simple, as the pressures of national assessment regimes and funding imperatives focus attention on the limited part of the curriculum that is formally taught in class.

### **Stretching the boundaries of the vocational curriculum**

Across the case studies it is evident that understanding the learning path of a student into an occupation necessarily requires that attention be paid to the prior learning needed and which learning is needed in the workplace to round off formal learning in the qualification.

Examples of this include the approach that Bell takes in investing in early childhood development (ECD) and primary education in order to ensure that the future artisans whom it recruits have the necessary hand–eye coordination, or at a higher level, an approach taken by the South African Sugar Research Institute (SASRI) in its recruitment of scientists where it tries to recruit well-grounded science students and does not focus on whether they have any background in the sugar sector. In general, across the cases, the emphasis on good, basic education is foregrounded.

At the other end of the vocational programme, it is also clear that the formal qualification cannot be the end point of the vocational curriculum. There is always a period of learning on the job that is part of the requirement for becoming competent, and the degree to which this is structured and is part of the shared understanding between individuals, employers and education providers is central to the success of this approach. There are a number of models that emerge from the case study, including ways in which this form of learning is integrated into the qualification, as in WIL. However, we would argue that various forms of WIL should be distinguished from the early period of work, where a new colleague is progressively included in communities of practice that may be firm-specific. Even with work experience and other types of workplace-based learning, full competence is

achieved only when employees are properly inducted into the workplace and are fully accountable as employees.

This understanding of the role of the employer in rounding off vocational education through induction and mentorship is not uniformly present. In the case of Bell and the SASA, there are very structured induction and mentoring programmes that build on the formal curriculum. However, programmes like the National Certificate (Vocational) in Automotive Repair and Maintenance (NCV ARM) are assumed to produce employable graduates, without there being any communication between the college and employers as to what can reasonably be expected from a graduate and what should still be taught through induction and mentorship.

Opening up the space for discussion about what is required from prior learning and what is still needed post-qualification is critical to developing an expanded understanding of the full pathway into an occupation. As long as this is restricted to the formal curriculum linked to a course or qualification, it is unlikely to capture the full complementary roles of the major parties in the process.

### **The employers' curriculum**

The argument that a responsive curriculum is necessarily tightly framed by the needs of employers is generally seen as a self-evident truth. It is after all only the employers that know what they need their employees to be able to do. Thus tightly focused curricula that do not cover non-essential knowledge areas are preferred.

This argument is not supported by the findings in the case studies. There are a number of examples that point to the problem of being overly reliant on employers to define the curriculum in a way that negatively impacts on the wider employability of students as a result.

The Pulp and Paper Diploma serves as a useful example. This qualification 'ticks all the right boxes' in terms of collaboration between industry and an education provider, including the secondment of industry specialists to the university. The specific needs of this industry and the specific processes

were not being adequately covered by the existing chemical-engineering programme. However, owing to a variety of factors, the specialised programme has become less desirable for students (as it too narrowly ties them to one industry and does not carry Engineering Council of South Africa (ECSA) recognition) and so it attracts students who cannot access other qualifications. Invariably, students use the qualification as an access route into the more general programme and are thus not channelled to the industry that has sponsored the programme. The decision by the industry to rely on NSFAS funding rather than supporting students directly resulted in the bursary obligation falling away, and thus the industry now gets graduates who do not really wish to work in the pulp and paper industry. The industry thus believes that the quality of the graduates does not meet its needs, despite the fact that there is a curriculum that is very focused on the specific industry.

A second contrasting example is the forestry industry, which also has very strong relations with two of the key education providers that offer forestry qualifications. In this case, the focused programme still provides access to forester jobs within the industry. The regular involvement of industry representatives in the curriculum committees at Nelson Mandela Metropolitan University's (NMMU) George Campus: Saasveld ensures that the qualification remains relevant. Nevertheless, interviewees reported the growing concern that the qualifications were not attracting the type of students that they would ideally like. This was attributed to a decline of interest in forestry among young people, particularly as the assumption was that one would have to work in rural areas. These concerns applied to both the diploma and research/postgraduate tracks, with those involved in the Stellenbosch programme also expressing some concerns about the smaller pool of applicants.

A tight alignment of a curriculum with employer needs does not necessarily result in a better supply of employable graduates for the wider industry. Because these seemingly responsive and aligned curricula become narrowly linked to one employer or one industry rather than a broader occupation, there is a risk of the programme being perceived to

be restrictive in terms of longer-term employability and mobility. With generally poor levels of career guidance in the schooling system, young potential graduates rely on their limited knowledge of the labour market to make decisions about the programmes in which they enrol. Where sectors of the economy are deemed to be unattractive or are simply unknown, no amount of curriculum alignment will make the programme more effective.

The NCV ARM curriculum has also recently been scrutinised by training experts in the leading automotive firms in South Africa who have collaborated in developing materials for the programme (Bialobrzaska 2015). The curriculum has thus had extensive employer input. Yet, at the level of local, small-scale automotive firms, there was limited or no knowledge of the programme and thus firms did not see graduates from the NCV as potential recruits. The issue is thus not a problem with the alignment of the programme to employer needs, but rather the lack of awareness about the programme and existing systems of recruitment (through local networks) that attach value to this qualification. Obviously, some of that lack of trust may have come about as a consequence of actual or perceived poor performance of colleges and their graduates, but the case study suggested that lack of awareness and interest was the primary factor.

The question of value also arose in the context of forestry, where a number of institutions, including universities located close to forestry sites, had introduced forestry-related programmes that the industry did not view as necessary and therefore preferred working with well-established providers. At issue was not the curriculum, but rather the level of trust in the institution, something often associated with historical patterns. Tradition and where employers themselves were trained play a significant role in what is valued. This is elaborated on below.

## Occupations

The various case studies raise interesting issues in relation to whether education providers and their qualifications should focus on training for a sector or training for an occupation. The discussion above

has already alluded to some of the concerns associated with programmes that are narrowly tied to a particular sector or even a specific firm. In a context where work is rapidly changing and an economy where once-strong sectors are imploding, there is little value from the perspective of the students' employability in linking the qualification too closely to a sector or firm. This does not in any way reduce the need for training that is specific to the level of the sector or firm, but this should not be the core of qualifications. The example of the SASRI, which does not expect researchers to have prior knowledge of the sugar industry, is a case in point. What this organisation looks for is excellent research skills in relevant disciplines that can then be applied to sugar-specific problems. Where recruits require a better grounding in the sugar processes, the SASRI offers an in-house certificate that provides this background. Similarly, in the various engineering programmes, there is an attempt to cater for a wide range of possible worksites.

This approach will almost of necessity result in tensions and in contestation over what the core knowledge that is covered needs to be. Inevitably, different industries and specific firms will have different expectations. It was precisely the concerns that there was insufficient focus on the specific processes central to the pulp and paper industry that led to the decision to create a dedicated programme for this industry. However, as has been shown already, this level of specialisation at qualification level is not always beneficial for employers and employees. Rather, the contestation and debate about what is core knowledge for an occupation/profession should be encouraged and critically engaged with by employers, professional bodies and education providers.

The industry-specific or firm-specific knowledge is best dealt with as training within a firm or at industry level. This requires a recognition by employers that this is not – and should not be – the task of the education provider and the curriculum of the qualification. What the qualification should provide is the knowledge base and the core skills for a graduate to be able to learn in a workplace setting, and apply and adapt the knowledge to the specific

sector or the specific firm. Where the training provider is a firm, and the training is conducted in-house, there is a high degree of control over the way the curriculum is offered. However, even in those contexts where firms undertake the training towards some form of certification, it is nevertheless preferable that the training equip the student for the occupation and not just the firm's requirements. A good assessment instrument such as a trade test that is credible across the occupational landscape and is trusted by employers can mitigate against a too-narrow firm-level focus.

There are, of course, some occupations or professions that are industry-specific, such as that of forester, and there may therefore be a need for a qualification that is specific. But this should be treated as an exception rather than the rule.

## Partnerships and trust

The discussion on curriculum above alluded to partnerships between employers and education providers. A wide range of partnerships was identified across the cases. Participation in curriculum processes, funding students, funding staff, co-supervision, and various forms of internship or workplace-based learning were examples of partnerships. These partnerships are generally viewed as positive and enhancing for the students' employability and enable the education institution to be responsive to employer needs.

In some cases, the partnerships have a formalised arrangement, with committees being established to provide forums for interaction. This is the case in the forestry sector and the automotive engineering sector where the industry body is represented on curriculum committees at universities. In other cases, the linkages are looser and are dependent on individuals. The scientists working in the sugar sector, for example, are encouraged to link with universities and to develop collaborative research projects. Most of the research scientists working in the sugar sector are honorary research associates linked to one or other university and are able to co-supervise students and access university research infrastructure. Unlike forestry, and perhaps because they are drawing students from a number

of disciplines that are not sugar-specific, they do not play a very direct role in interacting with academic departments in feeder universities. Forestry academics also have strong industry linkages and their research and consultancy work are often funded by the industry. The academics' international linkages through their research networks thus shape the curriculum and practices in the industry.

From the perspective of the firm, Bell has developed extensive partnerships with a range of education institutions from ECD centres through to universities. These partnerships vary, but are all motivated by a combination of community service and assuring the skills supply for the company. These extensive networks ensure a strong presence in the community for the firm and high levels of commitment from employees to the values of the company as well. This has partly ensured that the firm has been able to survive some of the less favourable economic cycles in recent times.

The partnerships are not without transactional costs. Time and other resources are required to make them work and there were instances where the costs were deemed to be too high. In the case of engineering at the UoT, the faculty was of the opinion that the difficulties and resource demands of arranging work placements could not be justified. Developing funding models that make it possible to develop sustainable partnerships is thus a key policy imperative, and one that is discussed in the next section.

A key outcome of positive partnerships is high levels of trust between different role players. Where levels of trust are high, there is little need for formal mechanisms of articulation or recognition. For example, employers in the sugar sector place a high value on the two certificates on offer at the SASRI, despite the fact that they are not accredited within the formal education system. In contrast, two forestry qualifications which are fully accredited and which are offered through public universities have limited credibility with employers in the forestry sector because there is no perceived need for these qualifications, and because there has been no communication with industry role players in the setting up of these qualifications. Similar lack of

knowledge, and therefore trust, was in evidence in relation to the NCV where local employers expressed no interest in employing graduates with this qualification. This is not true for students in the artisan-development programme at 'Motor Manufacturing South Africa (MMSA)', where the curriculum of the NCV was deemed appropriate, largely because there had been direct involvement in its development.

Stellenbosch academics also indicated that, because of the long association with employers, they were able to assert their perspective as to what should be included, and that this was respected. This demonstrates that partnerships can also strengthen the role of the education provider in shaping the curriculum. This is an important issue, as, too often, the concept of partnerships is framed either around resources that can be extracted from the partners, or as a mechanism through which employers can influence the college curriculum. In other words, the relationship is largely one-sided. A partnership should be beneficial to both parties and strengthen both sides. Through partnerships, communication becomes possible, which allows both employers and education providers to engage each other on the possibilities and constraints associated with a programme, and this helps to strengthen the understanding of some of the educational issues associated with developing skilled people.

## **An ecosystemic approach**

The concept of a skills ecosystem emerged out of a critique of the tendency to describe and plan for economies as 'high' or 'low' skills in the 1980s and 1990s (Buchanan et al. 2001). Critics of this approach pointed out that one can often have high-skill regions or industries within low-skill economies, and vice versa. Focusing on shifting an economy into a high-skills mode (or into a services mode as another example) is too static a model of how skills interact within an economy or specific industry. Initially deployed to describe how regional high-skill economies develop, such as Silicon Valley, the concept is now used to describe the mix of socio-economic factors that make an industry or regional economy function. Buchanan et al. (2001:

21) define a skill ecosystem as 'clusters of high-, intermediate- and low-level competencies in a particular region or industry shaped by interlocking networks of firms, markets and institutions'. An ecosystem is in a complex state of flux, with a range of internal and external pressures that impact on the various institutions or economic formations. In any ecosystem, there will be a spectrum of skill demands, skill-supply issues and contextual factors interacting, often – but not solely – through institutions.

The case of the sugar industry is particularly instructive as an example of an ecosystem where employers and educationists are closely connected through the coordinating structures of the industry, which, in turn, allows for focused interaction with E&T and the state more generally. The industry is dependent on a range of skills, from cane cutters through to scientists investigating disease control or new hybrids. On the milling side, there are evolving technologies, including possibilities of co-generation of electricity, and biofuels are an important emerging alternative to sugar production. Transportation and logistics are critical to the efficient processing of cane, as the sugar yield deteriorates the longer the cane is not processed. Like all agribusiness, water resources and weather patterns play a crucial and unpredictable role, as do international pricing structures. With this complexity, skill supply and skill demand are just two of the many factors. However, because there are such strong coordinating structures, the low- and intermediate-skills training can be rapidly responsive to shifting needs, and the curriculum can be adjusted as soon as new innovations are introduced to the sector.

Employers directly fund (through their membership of the SASA) knowledge production (via the SASRI and the SMRI), as well as knowledge dissemination and skills training (through extension services, short courses, and qualifications offered through the STC, the SASRI and the SMRI), and these functions are closely connected, resulting in the development of multiple interacting networks of actors and information flows. The curriculum can therefore be constantly adjusted as feedback into the system happens. In part, this is possible because there has been a deliberate avoidance of some of the

retarding effects of education bureaucracy within the wider South African system. The Junior and Senior Certificates are not subject to the external constraints of NQF levels, notional study hours and generic outcomes. They can be adjusted for specific groups or to address new developments in the field without constraint. And where formal requirements are needed (such as in respect of the trade tests), the curriculum is expanded where necessary.

This level of interaction is not easily replicated across all economic sectors. Education providers that are not tied to a specific industry have to deal with competing demands, as has been found with institutions offering the NCV ARM or the engineering programme at the UoT. Even programmes that are industry-specific, such as qualifications in forestry or the pulp and paper programme, have to be accountable to other role players or multiple industry voices. However, what is key in the sugar case is that, despite complex networks and multiple role players, there are very high levels of trust between the various components that ensure communication and knowledge transfer. Building up networked relationships between educators, employers and employees, including producers of knowledge (researchers and innovators), is critical to a responsive curriculum and trust in the value of the E&T that is offered. This level of coordination is not easily achieved and is partly a consequence of policy, as the Sugar Act of 1978 created the SASA as a statutory authority with powers to regulate the sugar industry. A similar dispensation does not exist in the forestry industry, for example, and there is consequently less authority vested in the coordinating body.

While it is unusual to apply the concept of a skills ecosystem to the level of the firm, the way that Bell engages with its surrounding context and has long-term views on the supply of skills is in many respects an ecosystemic approach. Bell requires high-level engineers and designers for the research and development of its products, but is equally cognisant of the fact that it needs artisans and mechanics who can provide the labour required to produce the machines and service them once they are being utilised by clients. There is a strong sense

of co-responsibility between Bell and various parts of the education system, starting at the level of ECD in surrounding communities, through to partnerships with technical and vocational education and training (TVET) colleges, bursaries, and engaging with universities by way of their advisory panels. But, even though there is extensive engagement with education providers, there is no expectation that the employees recruited from these institutions should be fully work-ready. Instead, the company provides extensive in-house training in the specific products and work processes that ensures that workers are progressively inducted into the culture and processes of the firm. This approach appears to generate high levels of loyalty and has allowed Bell to weather external factors such as recession.

To a large extent, both Bell and the SASA represent small-scale examples of how skills ecosystems can work. There is a recognition of the multiplicity of relationships that are needed in order to maintain a degree of skills equilibrium and, while there are challenges, both cases demonstrate that skills development, even on a relatively small scale, is

primarily about communication channels and relationships rather than highly managed planning mechanisms. Both employers invest in the education system and in the training of their current and prospective employees at multiple levels, train more widely than their own needs, and are learning organisations.

Skills ecosystems also highlight the locality of skills. Bell is very much nested in its specific context. Knowledge of the local community and understanding the local institutions allow for a responsiveness that is very grounded. There is also a recognition that the bulk of the employees is going to come from the immediate surroundings. This makes issues of the shortage or oversupply of skills a local issue. While some skills are mobile, this cannot be assumed as a given. Thus, when planning skills development, it is important to understand the local dynamics and which training is possible locally. That said, forestry work is primarily located in KwaZulu-Natal, Mpumalanga and the Eastern Cape, and yet the two key programmes are offered in the Western Cape. It is not clear whether this is a limitation.

## 4. POLICY IMPLICATIONS AND SKILLS PLANNING

What, then, are the implications for skills planning and skills development more generally? South Africa has tended to adopt an approach that has been described as a belief in the redemptive power of policy (Jansen 2004: 88). However, the broad cross-cutting themes that emerge do not suggest that new regulations are necessarily required. Rather, policy should, as far as possible, create enabling environments that make the strengthening of relationships between different components of the system possible. In most cases, this does not require significant change, and thus this section will discuss policy and practice. The implications for the different role players in the system will be discussed separately, although it is important to understand that the actions will be most effective in combination. For example, providing education institutions with the resources to mitigate the transactional costs required to build relationships and partnerships is key. Similarly, incentivising employers to participate in interactions with education providers may galvanise these relationships, particularly if this can be achieved at an industry or occupation level rather than at the level of the firm. However, these policy instruments will only work if they are coupled with a commitment to the process on the part of both parties, and with a sense of collective responsibility for the curriculum as an extended process spanning basic, formal and work-based learning. This points to a general insight: the quality of basic education underpins all levels of the post-school system. Ensuring that basic education levels are improved may be the single-biggest intervention in the vocational education and skills system.

### **Department of Higher Education and Training**

The Department of Higher Education and Training (DHET) is the overall custodian of the system under discussion in this report. Through its structures and the entities that report to it, it has the greatest influence over the system and can act as facilitator in bringing role players into dialogue. It is also the employer of the majority of vocational teachers and can thus actively influence the degree to which those teachers are incentivised to build the relationships that make curricula responsive. A policy on lecturer professional development and funding the ongoing support of lecturers in colleges (and higher education colleges and universities of technology (UoTs) so that lecturers remain connected to the world of work is needed to supplement the current requirements for qualifications.

One of the specific aspects that require attention is the issue of funding the workplace components of the system. There is much emphasis on the need for the placement of students in the workplace, although the benefits are contested. Clarifying the role of workplace exposure, and funding this adequately if it is deemed beneficial, is an important matter to resolve. It should be noted, though, that employers expressed the benefits in terms of being able to select students and did not foreground the training component, which suggests that the educational programme may not be well thought through.

A further policy question is loosening up the issue of narrowly tying qualifications and courses to particular National Qualifications Framework (NQF) levels. At times, work processes require knowledge to work at a range of different levels, with some parts of a curriculum being at a high level and other aspects being very introductory. This may make a lot of sense in relation to a specific sector or firm, but is not easily dealt with within the constraints of the NQF. There may be a case for allowing much greater flexibility in occupational- or sector-related programmes. This is a matter that requires further research, ideally by South African Qualifications Authority (SAQA) and the Quality Council for Trades and Occupations (QCTO).

The research also flags the need for policymakers to ensure that employers are fully aware of changes to qualifications that affect their industry. Without this understanding and trust being well developed, there will be serious consequences with respect to students' employability. Generally, employers appear to value stability and continuity, and, consequently, new qualification names are a point of confusion. Continual changes in qualifications are not advisable and, where possible, reform of the existing curriculum is likely to be a more productive route.

The NQF with its three subframeworks has created the potential for more flexibility, but there are also signs that there could be new blockages arising from a lack of alignment of qualifications across the subframeworks. SAQA needs to be empowered to interrogate the articulation of qualifications that ensure that students are able to progress.

## **Sector Education and Training Authorities**

The Sector Education and Training Authorities (SETAs) are ideally positioned to act as a broker between education providers and employers. Many are already playing this role in building the linkages

between different role players. However, the transactional costs that occur for parties involved need to be mitigated, and SETAs can assist in this regard. Improving awareness of new qualifications and the curriculum, creating industry and occupation-specific forums for curriculum discussions, and supporting education providers to collaborate on the development of courseware and new knowledge fields as part of qualifications are all examples of brokerage roles that the SETAs can facilitate and fund.

The issue of work placement and work experience is a critical part of the vocational education system. SETAs have the ability to assist in identifying the places available and getting students into the workplace and, where necessary, incentivising this for employers. However, there needs to be clarity on the purpose of the placement and its educational value so that this exercise is not turned into a numbers game with little value for students.

In terms of the skills-planning role that SETAs play, it is important to understand the regional and local dynamics of particular occupations and the level of mobility of people with skills, particularly at the lower and intermediate levels. Aggregated data at national level does not reveal how skills interrelate and so local-, regional- and industry-level analyses of ecosystems need to feature as part of the sector skills plans, with specific support for enhancing local skills pathways.

## **Employers**

For employers, a key implication is seeing training, induction and mentorship as an integral part of producing an employable person. Education providers cannot produce work-ready graduates for every setting. They need to provide graduates who are able to learn in the workplace, and this learning needs to be systematic so as to ensure maximum benefit to both parties. Skills-levy funding should be made available for this.

# CONCLUSION

The seven case studies have highlighted a range of issues that impact on employability. The problem that was investigated of how an education and training system is responsive, and to what – or whom – it is aiming to respond, is perhaps more accurately understood as a dynamic, multidimensional assemblage rather than a disequilibrium between supply and demand or a narrow curriculum matter. Employability as a concept, then, cannot be understood as an individual matter such as a skill set or a set of general attributes. These have a bearing on whether an individual is able to access employment, but they are only useful in concert with a range of other actors and processes. Without employers willing to play a role in training, or without actual vacancies, or where trust in institutions is low, there is very little

possibility of enhancing employability simply through curriculum interventions.

The case studies highlight the complexity of skills planning. High-level planning based on reported or actual shortages does not take account of the real-life paths that people take to enter into employment. The choices made, the wrong turns, the serendipity, the care taken by educators, the commitment of employers, as well as the systemic support provided by the state, all feature at the micro-level and cannot be easily planned. The outcomes of complex systems are not random or totally unpredictable, but they are not controllable. From a policy and planning perspective, this suggests that steering, incentivising and facilitating interaction may be as good as one can get.

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LABOUR MARKET  
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### **Employability and Curriculum Responsiveness in Post-School Education and Trainings**

The apparent mismatch between industry needs and the educational outcomes of the South African system points to a potential lack of responsiveness on the part of post-school education and training institutions, to enhance the employability of their graduates. This study explores the interface between various dimensions of the curriculum, and the drivers of institutional and curriculum responsiveness, within the context of debates about employment and employability. The lens of curriculum responsiveness was used to conduct seven case studies in two economic sectors: agribusiness, and automotive production and maintenance. Curriculum responsiveness is a complex interplay of multiple factors, and not a simple correspondence between employer needs and the curriculum.

#### **About the LMIP**

The Labour Market Intelligence Partnership (LMIP) is a collaboration between the Department of Higher Education and Training, and a Human Sciences Research Council-led national research consortium. It aims to provide research to support the development of a credible institutional mechanism for skills planning in South Africa. For further information and resources on skills planning and the South African post-school sector and labour market, visit <http://www.lmip.org.za>.

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