

Chapter 5

Improve the quality of doctoral education

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Internationally the increasing demand for doctorates is often accompanied by concerns about the quality of many of the new graduates. In a recent study on PhD holders in China, Cyranoski et al. (2011: 277) argued that although the number of doctoral graduates has gone through the roof, the quality of these qualifications remains a problem.

In a recent paper on doctoral success and quality in South Africa, Bitzer (2012: 1183) refers to two ‘incidents’.

An Associated Press article (Fox and Daniel 2011) reported that research submitted by former Haitian president Jean-Bertrand Aristide for a doctoral degree in African Languages at the University of South Africa in 2007 was labelled by scholars in the field as ‘a piece of rubbish’. It was also disclosed that the professor who supervised Aristide’s dissertation headed the committee that heard him defend the thesis. Leading African linguists who questioned the research found, amongst other things, misspelt Zulu words and claimed that his work ‘made a mockery of African Languages’ (Fox and Daniel 2011: 1). *The Independent* (Magome 2011) reported that the acting vice-

chancellor of Tshwane University of Technology in Pretoria allegedly included a fake doctoral degree as part of his CV when applying for the post. The University Council consequently took the appointment of a new vice-chancellor into revision and launched an investigation into the matter.

These examples might not typify everyday problems in the average university faculty or department in South Africa or elsewhere, but they do illustrate that the quality and legitimacy of doctoral degrees might be compromised if appropriate measures – and, more importantly – ethical behaviour and quality control are not put in place.

Anecdotal evidence points to increasing numbers of doctoral theses being returned for further examination and the quality of theses produced by certain departments and universities increasingly being questioned. We would argue that the imperative for high-quality doctoral graduates and theses needs to be constantly restated and re-affirmed. Policy directives (see below) that require excellence in doctoral education have to be translated into best practices to ensure that we continue to produce high-quality doctoral graduates who can make a contribution to the knowledge society.

Policy in support of quality

The National Commission on Higher Education (NCHE 1996) concluded from an international survey that there are certain commonalities amongst most established quality assurance systems. First, the majority include a self-evaluation process followed by an external peer assessment of the results and process of self-evaluation. Second, through self-evaluation and peer review, the higher education system ‘owns’ the quality system. Third, an independent body usually coordinates the external peer review process, which is conducted according to more or less standardised criteria. The NCHE proposed that a developmentally based quality assurance system be established that would address institutional auditing, programme accreditation and quality promotion. The institutions responsible for this would be the newly established (1998) Council on Higher Education (CHE), which included the Higher Education Quality Committee (HEQC). Both these bodies are recognised by the South African Qualifications Authority (Cloete 1998).

While many institutional audits have been carried out, with external peer reviews, they never focused on the doctorate, which has been left ‘untouched’ with the traditional practice of one internal and two external examiners. In some institutions at least one of the externals must be from outside the country.

Chapter 1 alluded to the fact that concerns around the quality of doctoral programmes were raised as general principles (ambitions) by both the

1996 National Commission on Higher Education (NCHE) and the 1997 *Education White Paper 3*. The first indirect attempt at addressing doctoral quality in terms of a strategy was the 2000 CHE report on the size and shape of the higher education system. Their proposal for a differentiated system consisting of *bedrock* (mainly undergraduate), *extensive masters and selective doctoral* institutions and *comprehensive postgraduate and research institutions* amounted to an indirect quality assurance mechanism. It proposed that the comprehensives, which are not conceptualised in the same way as the later (2004) three institutional types, would offer quality undergraduate programmes and a wide range of programmes at both masters and doctoral levels. These institutions would also be permitted to exercise their research capabilities across a broad range of areas, i.e. function as research universities.

A majority of higher education institutions reacted strongly and negatively to the CHE's three categories. The proposals were not seen as steps towards improving either the efficiency or the quality of doctoral programmes. Rather, they were interpreted as ways of entrenching the disadvantages that historically black institutions had experienced under apartheid. Decisions on the offering of doctoral programmes, it was argued, could not be based in a simplistic way on the rigid boxes into which institutions were positioned and no public higher education institutions should be excluded from the offering of doctoral programmes. The Minister of Education rejected the CHE's proposals.

Consequently the 2001 *National Plan* had to formulate different ways of determining institutional diversity, and ultimately of placing limits on the range of doctoral programmes that institutions could offer. The *National Plan* said that the Ministry of Education would determine the programme mix at particular institutions, based on their programme profile and their demonstrated capacity, which meant that institutions would not necessarily be allowed to offer all the programmes that are contained in the (national) programme grid.

The final, detailed edition of the programme and qualifications mix (PQM) of each institution was submitted to the Minister of Education in June 2006. The Minister approved, in terms of the Higher Education Act No. 101 of 1997, these PQMs as formal listings of the qualifications that each institution was entitled to offer, and of the fields of study in which they were permitted to be active. However, these final PQMs could not be regarded as certifications of the quality of institutional programmes as very few of the doctoral programmes offered by South African higher education institutions have undergone detailed quality reviews by the CHE.

The various doctoral programmes that appear on the ministerial approved PQMs cannot be taken to be indications that the quality of these programmes has been certified.

The HEQC accreditation model located responsibility for higher education programme quality with the institutions themselves and proposed that institutions should maintain in-house quality assurance mechanisms. The extent of the external HEQC accreditation system would be to set the institutional criteria for monitoring the quality of programmes and the effectiveness of associated quality assurance mechanisms within the higher education institutions, and to validate the institutions' own monitoring information in this regard (CHE 2004; Mouton 2009).

A revised *Higher Education Qualifications Sub-Framework* (HEQSF) was published in August 2013, in accordance with *Education White Paper 3* of 1997, and following the CHE's *New Academic Policy* of 2002 and the *Higher Education Qualifications Framework* (HEQF) of 2008. The HEQSF applies to both private and public institutions and was implemented from 13 August 2013. The revised framework has 11 qualification types (five undergraduate and six postgraduate), mapped onto the top six levels of the National Qualifications Framework¹ (NQF), which elucidates the path from further education and training through higher education towards the attainment of a doctoral qualification. It also allows for alternative routes towards the doctoral degree via undergraduate certificate and diploma programmes, providing access for matriculants who have not attained the minimum achievement required to progress directly to an undergraduate degree programme (DoE 2005a, 2005b). It makes provision for two types of qualifications – a doctoral degree as well as a professional doctoral degree. It also stipulates the requirements, purpose and characteristics of a doctoral degree very clearly as follows:

The doctorate provides training for an academic career. It requires a candidate to undertake research at the most advanced academic levels culminating in the submission, assessment and acceptance of a thesis. Course work may be required as preparation or value addition to the research, but does not contribute to the credit value of the qualification. The defining characteristic of this qualification is that the candidate is required to demonstrate high-level research capability and make a significant and original academic contribution at the frontiers of a discipline or field. The work must be of a quality to satisfy peer review and merit publication. The degree may be earned through pure discipline-based or multidisciplinary research or applied research. This degree requires a minimum of two years' full-time study, usually after completing a Master's Degree. A graduate must be able to supervise and evaluate the research of others in the area of specialisation concerned. (CHE 2007: 40)

The professional doctorate is a newly introduced qualification type in South Africa. Its requirements, purpose and characteristics are:

The professional Doctorate provides education and training for a career in the professions and/or industry and is designed around the development of high level performance and innovation in a professional context. Candidates are required to undertake a combination of coursework and advanced research leading to the submission, assessment and acceptance of a research component comprising an original thesis or another form of research that is commensurate with the nature of the discipline or field and the specific area of enquiry. The research component should comprise at least 60% of the degree. Professional Doctorates may also include appropriate forms of work-integrated learning. The defining characteristic of this qualification is that in addition to the demonstration of high level research capability it requires the ability to integrate theory with practice through the application of theoretical knowledge to highly complex problems in a wide range of professional contexts. (CHE 2007: 41)

The HEQC and the revised HEQSF provides the necessary regulatory context for understanding what high-quality doctoral programmes mean. But quality in doctoral education goes beyond the quality of the programme and, more importantly, we need appropriate and rigorous measures to assess quality in a more comprehensive sense.

Measuring quality in doctoral education

There is general agreement (Blackburn et al. 1973; Comad et al. 1985; Holdaway 1997; Phillips 1993) that measuring the quality of teaching and learning – which includes doctoral education – is one of the more persistent challenges in higher education studies.

More than 40 years ago, in their comprehensive study of this topic, Blackburn et al. (1973) identified five categories of studies that are typically employed to measure different aspects of quality in doctoral education. These are: reputational studies (which include some form of peer evaluation by scholars or a department's graduate programme); scholarly productivity (when a critical objective is the production of new knowledge it makes sense that any research products that emanate from the doctoral thesis would be regarded as an indirect measure of quality); student quality (which is assessed by analysing undergraduate performance and even graduate records); efficiency as an index of quality (a focus on throughput and completion rates); and, finally, client satisfaction ratings (ratings by the

‘consumers’ of doctoral education are sourced through employer surveys and the like).

Since this study, other scholars have proposed a range of measures – direct and indirect – to measure the quality of doctoral programmes and graduates. Increasing numbers of studies have focused on the (publication) output of doctoral graduates by analysing the productivity and citation impact of such papers (Hasselback and Reinstein 1995). Similarly, the number of destination or tracer studies of doctoral graduates have also increased (for a review of South African destination studies, see Botha 2015). We have also, in more recent years, seen an increase in the number of studies that have gained access to doctoral examiner reports and analysed these (Powell & McCauley 2002; Holbrook et al. 2004).

However, it is fair to say that most of these studies focus on how examiners interpret doctoral theses and what they look for when making judgements about final acceptance. In this regard the paper by Kiley and Mullings (2004) (‘Examining the examiners: How inexperienced examiners approach the assessment of research theses’) provides an interesting new perspective on quality assurance as they compare how inexperienced examiners approach the examination of a thesis somewhat differently from experienced examiners. The biggest differences found were that inexperienced examiners pay more attention to institutional guidelines, tend to be uncertain about benchmarking, especially in regard to marginal theses, and have less experience of being a supervisor and hence display a tendency to hark back to their own postgraduate experience.

‘Quality’ of doctoral education is an elusive and complex construct. In order to get closer to an operational definition, it is necessary that we ‘unpack’ its constituent dimensions. For the purposes of our discussion in the chapter, we propose a framework that distinguishes between seven dimensions of quality:

- The quality of the doctoral candidate (at entry level);
- The quality of the doctoral programme;
- The quality of the doctoral supervisor;
- The quality of the supervisory process;
- The quality of the doctoral graduate (at exit);
- The quality of the doctoral thesis; and
- The quality of any journal paper or presentation emanating from the doctoral thesis.

It is important to emphasise that most of these dimensions are interdependent. The quality of the doctoral candidate (at entry level) is arguably the best predictor of the quality of the doctoral graduate (at exit level). The quality of the supervisory process is arguably a direct function of

the quality of the supervisor. The quality of the doctoral thesis and subsequent publications is a function of the quality of the doctoral supervisor and supervisory process and so on.

Even at first glance, it is obvious that it is either impossible or very difficult to apply direct measures in the assessment of all of these dimensions. In the table below we elaborate on each of these dimensions and also indicate where there are available direct (D) or indirect (I) measures for each.

Dimension	Elaboration/interpretation	Nature of available measures
Quality of doctoral candidate	Prior training and academic record of doctoral candidate Level of preparedness of candidate for doctoral studies	Academic records (D) Curricula vitae (D) Selection and screening processes of candidates (D) Feedback from supervisors (D)
Quality of doctoral programme	Consistency with NQF requirements	Accreditation of programme by SAQA and HEQC (D) Regular peer review results (D)
Quality of doctoral supervisor	Academic reputation and standing of supervisor Experience as doctoral supervisor	Curriculum vitae of supervisor (I)
Quality of supervisory process	Degree of guidance and support given to candidate Management of the supervisory process The burden of supervision	Feedback reports from doctoral students (I) Surveys of doctoral students (I)
Quality of the doctoral graduate	Employability of the graduate	Proportion of doctoral candidates employed on completion of studies (I)
Quality of doctoral thesis	Quality of the contents and argumentation of the thesis Contribution to the body of knowledge	Examiners' reports (D) Possibility of getting thesis published as a monograph (I)
Quality of doctoral publications	Quality of articles and presentations emanating from thesis	Quality of journals in which papers are published (I) Citation impact of papers (I) Invitations to present results of doctoral study at national and international conferences (I)

This table – which is not exhaustive – begins to demonstrate the nature of the challenge to measure the quality of doctoral education. Not only would one have to employ a whole range of measures to comprehensively measure and assess the quality of doctoral education in any system or institution, it is also the case that many of the possible (conceivable) measures are indirect (or proxy) measures. This means that they are invariably weaker measures of the construct being measured. In addition, where we are able to identify direct measures (such as examiners' reports of doctoral theses), considerations related to ethics and confidentiality would probably mean that access to such measures is impossible or highly restricted.

In our discussion in the remainder of the chapter we focus on the following four dimensions of quality for which there were readily available data in the South African system.

Dimension	Specific measures selected	Data sources
Quality of doctoral candidate	Level of candidate preparedness Screening and selection processes of doctoral candidates	<ul style="list-style-type: none"> • HEMIS data (DHET 2013a) • HEMIS data on progression trajectories (see Study 3 in Appendix 1) • Supervisor experience (see Study 4 in Appendix 1) • CHET/CREST study of productive departments (see Study 2 in Appendix 1) • Student reports (Mouton and Hunter 2001) • CREST survey and other studies (Mouton et al. 2009; Mouton et al. 2012)
Quality of doctoral supervisor	Qualifications of supervisor	
Quality of supervisory process	Degree of guidance and support given to candidate Management of the supervisory process The burden of supervision	
Quality of the doctoral graduate	Employability	

We do not discuss the quality of the doctoral programme, as the national process of accreditation of doctoral programmes is a stringent and transparent process and it is generally assumed that doctoral programmes meet the requirements as stated in the NQFS framework. As for the quality of doctoral theses and doctoral publications, we are not aware of any available evidence on these dimensions in South Africa.

Quality of the doctoral candidate

Our focus here is on two dimensions of the quality of the doctoral candidate only: the level of preparedness of doctoral candidates and the nature of the screening and selection process. In both cases we rely on self-reporting data.

Level of preparedness

In our discussion on efficiency in Chapter 3 we reported on the typical trajectories of postgraduate students in South Africa. Given that between 60% and 70% of all honours, masters and doctoral students in South Africa study part-time (they work while they study), we highlighted the fact that large proportions of students invariably interrupt their studies. We showed that the typical study trajectory from a completed bachelors to a completed doctoral degree can be anywhere between 12 (minimum period) and 25 years (average maximum). This fact explains why the average age of doctoral graduates in 2013 was 41 and the average time to completion of doctoral degree remains close to five years.²

Our survey of doctoral enrolments in 2014 revealed that the most commonly cited reason for students interrupting their studies was that of employment conditions or work obligations followed by financial reasons. We also found that the progression rates for younger students (both at the honours and masters levels) are higher than for older-age cohorts, who are

more likely to be working while studying. And finally, among the top three reasons given for considering dropping out, across all three levels of study, are challenges to find sufficient time for studies, for example, the challenge of balancing work with studies. This is particularly pertinent to masters and doctoral students, as well as students older than 30.

All of this adds up to a picture in which large proportions of South African doctoral students would – by the time that they enrol for their doctoral degree – have typically interrupted their study career a number of times. Instead of an ideal trajectory where the student progresses quite quickly from undergraduate to lower and higher postgraduate levels, the typical South African doctoral student (with the possible exceptions of students in some of the natural sciences) enrolls for doctoral studies after a number of gaps and interruptions between honours and masters and between masters and doctorate.

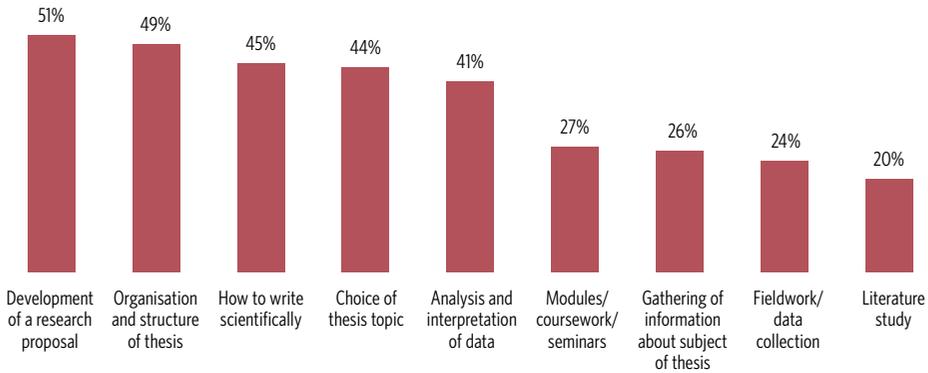
The inevitable result is that many doctoral students have to relearn basic research skills: skills related to research methodology as well as basic skills in searching electronic databases and doing literature reviews (see also the discussion on ‘student preparedness’ in Chapter 6).

Evidence from many workshops on doctoral supervision at most South African universities (the second author has facilitated more than 40 such workshops over the past ten years), clearly shows that supervisors are not only finding the increased numbers of students to supervise challenging, but – even more importantly – also the reality that a large number of prospective doctoral candidates are woefully underprepared for doctoral studies. Supervisors complain that many of their doctoral students cannot write scientifically, do not know how to search the literature, lack the required quantitative and qualitative skills to do proper data analysis, and so on. In cases where doctoral students are underprepared for the specific demands of doctoral studies, the doctoral supervisor has to devote more time to guiding the student through the doctoral research process.

In a survey of Stellenbosch doctoral students conducted in 2000, Mouton and Hunter (2001) asked doctoral graduates a number of questions about their doctoral experience. One of the sets of questions was aimed at establishing the extent to which the students have required a little, some or a lot of guidance from their supervisors.

The results were quite revealing as large proportions of students said that they required a *lot* of guidance with regard to the development of their research proposal (51%), the organisation of their thesis (49%), how to write scientifically (45%) and even in choosing their thesis topic (44%). In an ideal world, the doctoral candidate should be reasonably well prepared for most of these tasks. This is evidently not the case even at one of the top universities in the country.

Figure 5.1: Responses on supervisor guidance (2000)



Source: Mouton and Hunter 2001

Screening and selection for quality

It is generally accepted that rigorous screening and selection of doctoral candidates is an essential condition for effective and efficient supervision and a necessary condition to ensure quality in the process. Students with the required academic abilities, dedication and passion for scholarship are less likely to discontinue their studies.

However, the possibility of screening – through validating prior academic performance, personal interviewing and even psychometric testing of prospective candidates – is not always an option. Anecdotal evidence gained from supervision workshops conducted by the second author at most South African universities over the past seven years suggests that different rules and practices for screening and selection are used. In some cases, academic departments may not have the right to turn prospective candidates away, due to institutional policies or directives. Within some academic departments, the individual supervisors may also not have this right on account of departmental policies or a lack of adequate supervisory capacity. The question of how screening and selection is done in every specific case is the result of a complex interplay between the demand side (how many students apply to study at a specific department), the supply side (the available supervisory capacity in the department) and institutional and faculty policies, rules and targets about the ideal number of students to be accepted for doctoral studies.

In a survey of doctoral supervisors (Mouton and Hunter 2001), we put three options to our sample (the percentage of responses in each category appears in brackets):

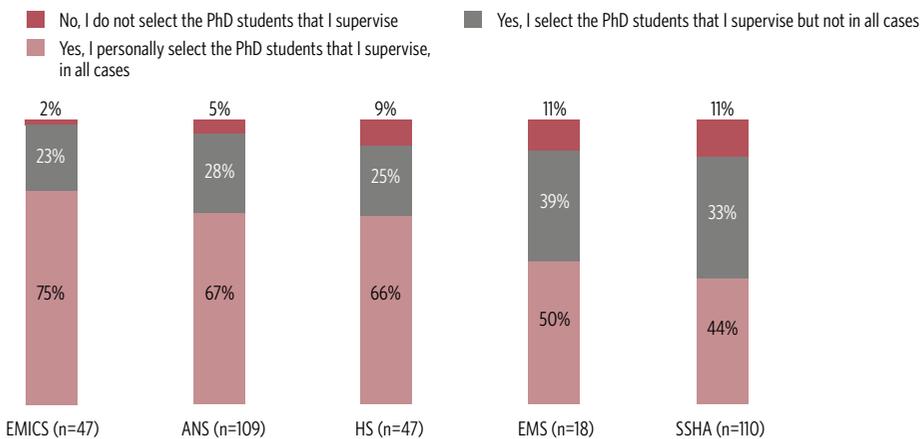
- Yes, I personally select the PhD students that I supervise in all cases (60%);
- Yes, I personally select the PhD students that I supervise, but not in all cases (33%); and
- No, I do not personally select the PhD students that I supervise (7%).

Although it is encouraging that the majority (60%) of respondents indicate that they are able personally to select all their doctoral students, it is cause for concern that the remaining 40% indicate that they are not permitted or able to do so in all cases or at all.

There are large and statistically significant differences in the responses of supervisors from different scientific fields (Figure 5.2). Supervisors in the Social Sciences, Humanities and Arts (SSHA) as well as Economic and Management Sciences (EMS) seem in general terms to have less choice in the selection of their doctoral students than their counterparts in the science, technology, engineering and mathematics (STEM) fields. This may be a consequence of the greater demand for doctoral studies in these fields and smaller numbers of staff with doctoral qualifications in these fields. But this specific issue clearly requires further investigation.

We were also interested in establishing which criteria are being used for student selection. It is interesting (Figure 5.3) that the two academic criteria

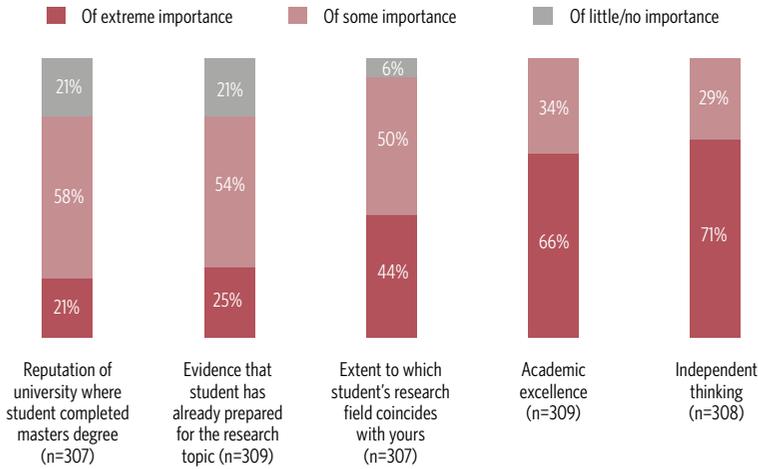
Figure 5.2: Selection methods of PhD students supervised, by scientific field (2000)



Note: Statistically significant relationship: $\chi^2 = 20.76, p < .05$.
 EMICS = Engineering and Mathematical Sciences
 ANS = Agriculture and Natural Sciences
 HS = Health Sciences
 EMS = Economic and Management Sciences
 SSHA = Social Sciences, Humanities and Arts

Source: Mouton and Hunter 2001

Figure 5.3: Perceived importance of specified criteria for the selection of PhD students (2000)



Source: Mouton and Hunter 2001

(independent thinking and academic excellence) in the survey were consistently rated as being the most important. Other criteria, such as the alignment of the student's interest with that of the supervisor and the degree of preparedness of the student, were rated much lower.

As we only reported on two dimensions of the quality of the doctoral candidate it is impossible to draw big conclusions. As to the level of preparedness of the student, evidence from our doctoral supervisor study, our progression and retention survey and more anecdotal evidence (albeit from a large number of interactions with supervisors) would tend to suggest that many doctoral students are not adequately prepared for doctoral studies. As to the matter of screening and selection of only the best doctoral candidates, again the evidence seems to point to a variable picture where rigorous screening may be the practice at some universities and within some departments, but it does not seem to apply across the board. Our first conclusions already point to areas of concern as far as the quality of doctoral education is concerned.

Quality of the doctoral supervisor

At all South African universities it is required that a supervisor of a doctoral candidate must himself or herself be in possession of a doctoral degree. Ideally one would prefer a situation where the supervisor does not only have a doctoral degree, but is also an experienced scholar and a supervisor

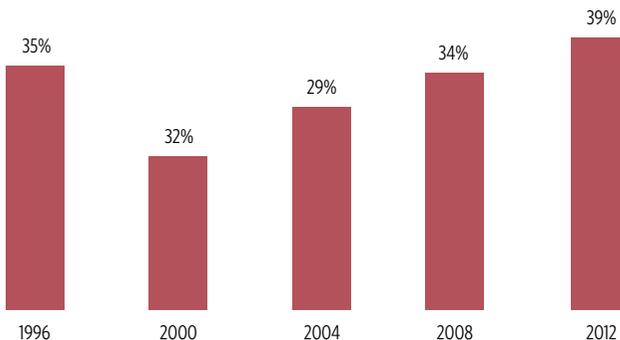
with some experience. However, given the huge growth in numbers of doctoral enrolments and in the increasing burden of supervision, it is now commonplace that academic staff find themselves in the situation where they have to supervise their first doctoral candidate very soon after completing their own doctoral degree.

It is therefore not surprising that – at the systemic level – concerns are expressed about the available pool of doctoral supervisors in the country. According to the *National Development Plan* (NPC 2012), having staff with doctorates is a prerequisite for the acceleration of knowledge and research outputs, and for the improvement of the qualification levels of academic staff at universities.

Although this is clearly also an efficiency issue, we have decided to present the data on the available supervisory capacity in this chapter for the simple reason that having enough properly qualified supervisors constitutes a first and necessary condition for high-quality doctoral education in any country. In the remainder of the section we present an overview of the existing supervisory capacity in the system.

Figure 5.4 shows the proportions of academic staff with doctorates for the period 1996 to 2012. It is evident that the qualification levels of academic staff first declined as a result of the rapid expansion of the system and the consequent appointment of a large number of academic staff without doctorates. During the period 1996 to 2004, 1 974 additional permanent academic staff members were appointed, but over the same period the number of permanent academic staff with doctorates declined by 162. Since 2004 this trend has been reversed and the percentage of permanent academic staff with doctorates increased from 29% in 2004 to 39% in 2012.

Figure 5.4: Percentage of academic staff with doctorates (1996–2012)



Source: DoE (1999), DHET (2013a)

Table 5.1 provides an overview of the supervisory capacity of the system through the ratio of doctoral enrolments and graduates to academic staff with doctoral degrees. The analysis reveals that the number of doctoral enrolments in relation to staff with doctoral qualifications has increased from 1.1 to 2.1 between 1996 and 2012. In practice, not all academic staff with doctorates supervise doctoral students.

The available number of academic staff with doctoral qualifications is of utmost importance for the supervision of doctoral students. Table 5.1 provides information about the number and percentages of academic staff with doctoral degrees, the ratios of doctoral enrolments to academic staff with doctorates, and the ratio of doctoral graduates to academic staff. Table 5.2 gives the same information according to institution type groupings.

Having a PhD should of course be a prerequisite for supervising a doctoral candidate. But it is at best only a necessary, and not a sufficient, condition for ensuring quality in the doctoral supervision process. The quality of the supervisory process – the degree of guidance and leadership given to the student, the attention to detail, the quality of feedback and many other aspects – is equally important to ensure quality of the final products – the graduate and the thesis.

Quality of the supervisory process

The burden of increasingly large numbers of doctoral students to supervise will manifest itself in different ways during the supervisory process. A survey of doctoral supervisors by Mouton et al. (2012; also see Study 4 in Appendix 1), addressed two specific questions: Firstly, what would the effect of large numbers be on the *alignment* between the expertise of the supervisor and the expectations and demands of the student? Secondly, what effect would the large numbers have on the time and attention that the supervisor can devote to each student?

As to the first issue, supervisors were asked whether they sometimes have to accept students who work outside their own area of expertise. This is an important issue because it is generally accepted that there is a big difference between how supervision is conducted where the supervisor is supervising students in his/her area of expertise and areas where the supervisor would not claim any expertise. When supervising students in one's own area of expertise (areas where the supervisor has published, given presentations and is generally recognised as an expert by his/her peers), the supervisory process is much more straightforward. On the other hand, when one has to supervise a doctoral student in areas outside one's own expertise, the supervisor needs to put in much more effort to keep abreast with developments and trends in that field, and also with the student, as the

Table 5.1: Academic staff with doctoral degrees and ratios of academic staff to doctoral students and graduates (1996-2012)

Year	Total academic staff	Academic staff with doctorates	Doctoral student enrolments	Doctoral student graduates	% academic staff with doctorates	Ratio of doctoral enrolments to academic staff with doctorates	Ratio of doctoral graduates to academic staff with doctorates
1996	13 449	4 647	5 152	684	35%	1.1	0.15
2000	14 184	4 561	6 354	834	32%	1.4	0.18
2004	15 423	4 485	9 104	1 104	29%	2.0	0.25
2008	15 936	5 403	9 994	1 182	34%	1.8	0.22
2012	17 451	6 744	13 964	1 879	39%	2.1	0.28

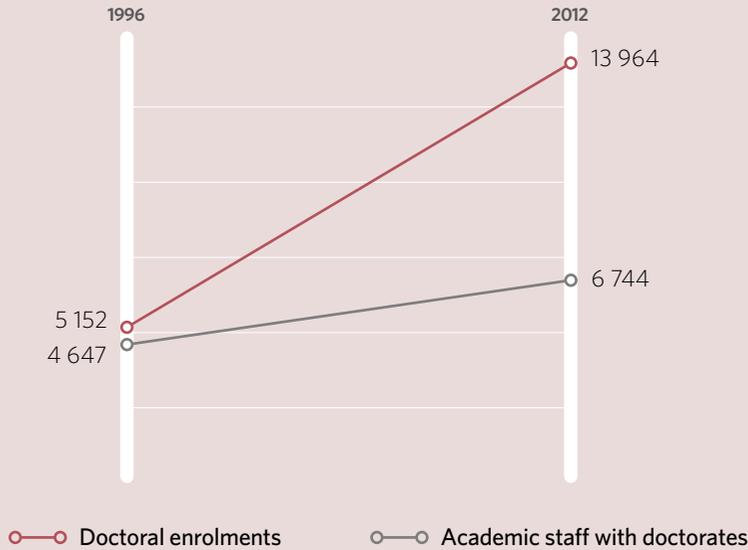
Source: DoE (1999), DHET (2013a)

Table 5.2: Academic staff with doctoral degrees and ratios of academic staff to doctoral graduates by institutional type (2012)

	2012 academic staff	2012 academic staff with doctorates	2012 doctoral graduates	% academic staff with doctorates	Ratio of doctoral graduates to academic staff	Ratio of doctoral graduates to academic staff with doctorates
Universities						
Stellenbosch	973	518	240	53%	0.25	0.46
Rhodes	336	171	67	51%	0.2	0.39
Fort Hare	315	119	43	38%	0.14	0.36
Pretoria	1 281	627	200	49%	0.16	0.32
Cape Town	1 077	699	199	65%	0.18	0.28
KwaZulu-Natal	1 399	663	177	47%	0.13	0.27
Western Cape	559	290	75	52%	0.13	0.26
Free State	949	380	94	40%	0.1	0.25
North West	1 248	628	154	50%	0.12	0.25
Witwatersrand	1 074	595	150	55%	0.14	0.25
Limpopo	825	132	17	16%	0.02	0.13
Subtotal: Universities	10 036	4 822	1 416	48%	0.14	0.29
Comprehensive universities						
Johannesburg	1 009	294	109	29%	0.11	0.37
Nelson Mandela	596	242	86	41%	0.14	0.36
Zululand	298	79	28	27%	0.09	0.35
South Africa	1 588	612	152	39%	0.1	0.25
Venda	328	103	4	31%	0.01	0.04
Walter Sisulu	583	70	3	12%	0.01	0.04
Subtotal: Comprehensives	4 402	1 400	382	32%	0.09	0.27
Universities of technology						
Tshwane	855	178	44	21%	0.05	0.25
Cape Peninsula	765	124	24	16%	0.03	0.19
Central	274	72	5	26%	0.02	0.07
Durban	599	88	6	15%	0.01	0.07
Vaal	341	44	2	13%	0.01	0.05
Mangosuthu	179	16	0	9%	0	0
Subtotal: Universities of technology	3 013	522	81	17%	0.03	0.16
Total	17 451	6 744	1 879	39%	0.11	0.28

Source: DHET 2013a

The burden of supervision



Source: Table 5.1: Academic staff with doctoral degrees and ratios of academic staff to doctoral students and graduates (1996–2012)

process unfolds. These issues are directly linked to the quality of the supervision given.

The study found, and this is cause for concern, that a sizeable percentage (45%) of all respondents indicated that they sometimes have to supervise students outside their main area of expertise. The breakdown by main scientific field (Figure 5.5) shows that this situation is slightly more common in the Social Sciences, Humanities and Arts, and in the Engineering and Mathematical Sciences.

The second question asked how the increasing burden of supervision impacts on the attention that supervisors are able to give students. The results, again, are interesting: significant numbers of supervisors (32%, nearly a third of the respondents) feel that they do not give sufficient attention to their students. The disaggregation by main scientific field (Figure 5.6) shows that this situation holds for all fields, with an even larger proportion (60%) of respondents from the Economic and Management Sciences discipline agreeing with the statement (although the actual numbers are small).

Figure 5.5: Extent of agreement with statement: 'I sometimes have to supervise PhD work that lies outside my area of expertise', by scientific field (2011)

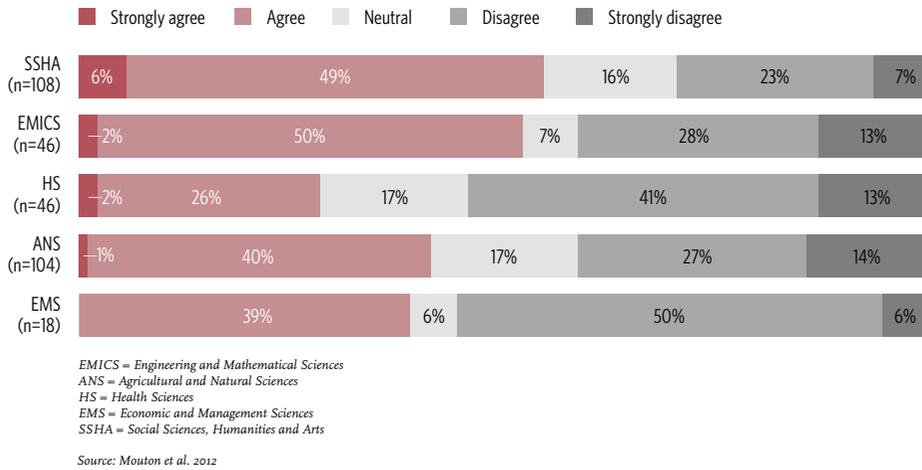
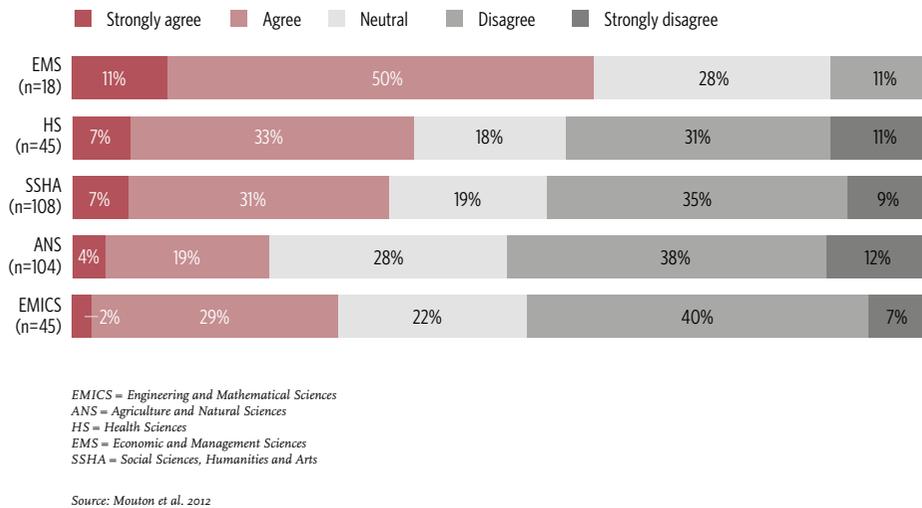
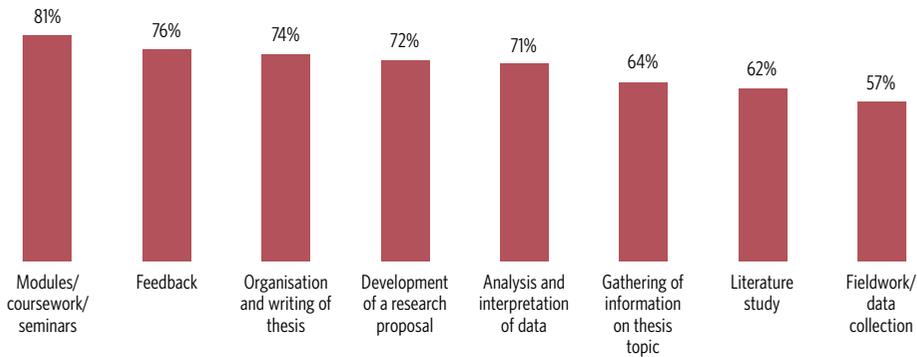


Figure 5.6: Extent of agreement with statement: 'I lack sufficient time to give each PhD student the attention that he/she deserves', by scientific field (2011)



In a study conducted in 2000 at Stellenbosch University of postgraduate students who had graduated at the university during the previous decade (Mouton and Hunter 2001), we asked students to indicate how they rated the quality of the supervision they had received in a number of categories. As Figure 5.7 shows, the overwhelming responses were positive. Large

Figure 5.7: Assessment of the quality of supervision by doctoral students
(% rated as 'excellent' or 'good') (2000)



Source: Mouton and Hunter 2001

majorities of respondents rated the coursework, feedback received, the assistance with the development of the research proposal and so on, as being somewhere between 'good' and 'excellent'.

Although this study is somewhat dated and confined to one university, it gives some indication of the quality of supervision as experienced by students.

Understanding how good-quality supervision occurs is not straightforward. A perspective from the supervisor highlights concerns about the amount of time and attention students require, their own time and expertise in the domain of the study and their own levels of experience. The perspective from the student is likely to be variable. Some students (who are better qualified, who are being supervised by the supervisor of their choice, who are well-supported by the university and department) are likely to report on good-quality practices. On the other hand, various studies have reported on student dissatisfaction with the quality of doctoral supervision.

An example of an excellent qualitative study on doctoral experience is Judy Backhouse's doctoral thesis of 2009. Although she interviewed a relatively small sample of doctoral students ($n = 38$), her findings are probably indicative of doctoral experiences of supervision. She summarises her findings as follows:

Many in this study appear happy with the supervision they get. They speak highly of their supervisors as 'very cool ... inspirational, supportive and all that' and 'the best supervisor in the world'. Some told tales of neglect and disagreements between co-supervisors that they had experienced during their masters degrees, and tales of

supervision disasters which they had heard of second-hand. There were cynical remarks about the practice of supervisor names appearing on student publications and suggestions that supervisors sometimes act selfishly in suggesting research directions and one person complained that his supervisor took three months to reply to e-mails. But otherwise people did not raise significant problems with supervision. (Backhouse 2009: 212)

In the absence of a comprehensive survey of doctoral experiences in South Africa (and not merely small-scale qualitative and often anecdotal studies), we would maintain that the quality of doctoral supervision is more likely to be good.

Quality of the doctoral graduate

The final ‘product’ of the doctoral education process is the doctoral graduate: someone who should, in theory, be more employable because he or she is more knowledgeable, skilled and competent in knowledge production. It has become common practice in doctoral destination and tracer studies (and also employer studies) to establish what the level of employability of doctoral graduates is (the quantitative question) as well as a more qualitative question about the ‘fit’ between the doctoral graduates and the demands of a specific employment. The evidence for this section is sourced from two studies conducted by CREST in 2010 and 2009 under commission from the Academy of Science of South Africa (ASSAf) (ASSAf 2010; 2011).

Degree of employability

ASSAf commissioned the Centre for Research on Science and Technology (CREST) at Stellenbosch University to conduct a tracer survey of humanities graduates from South African universities. Eighteen of the 23 universities in the country participated in the survey. A web-based survey was launched in February 2010 and closed by the third week of April 2010. A total realised sample of 12 064 graduates had completed the web-based questionnaire by the close of the survey, making this one of the biggest graduate tracer studies ever conducted in South Africa. A total of 3 617 graduates from the social sciences, humanities and arts (SSHA) completed the survey; 2 936 graduates from the economic and management sciences (EMS) and 5 488 graduates in the agricultural, natural, engineering and health sciences (NEHS). A small number (23) of students did not indicate their field of study.

A main finding of the study was that the *majority* of graduates from all fields of science obtained their first job in less than one month after

graduation. In all three broad domains within SSHA, the tendency is for graduates to find work within a period of six months after graduation, with the majority finding work in less than one month. Moreover, especially in the social sciences, there appears to be a shift from finding work in less than one month after graduation to between one and six months after graduation. This is evident in the fact that 79% and 18% of graduates from the most historical year-period (before 1980) reported that they had found work in less than one month and between one and six months, respectively, compared with 54% and 36% of respondents in the most recent graduate period (2000–2010).

These findings are consistent with one other major destination study conducted in the past ten years. In their study ‘Pathways from University to work: A Graduate Destination Survey of the 2010 Cohort of Graduates from Western Cape Universities’, Kraak and Du Toit found that 83% of graduates obtained employment during the two-year transitional period between graduation in 2010 and 1 September 2012. Excluding those who continued with studies in higher education, unemployment of 2010 graduates in 2012 amounted to about 10%.

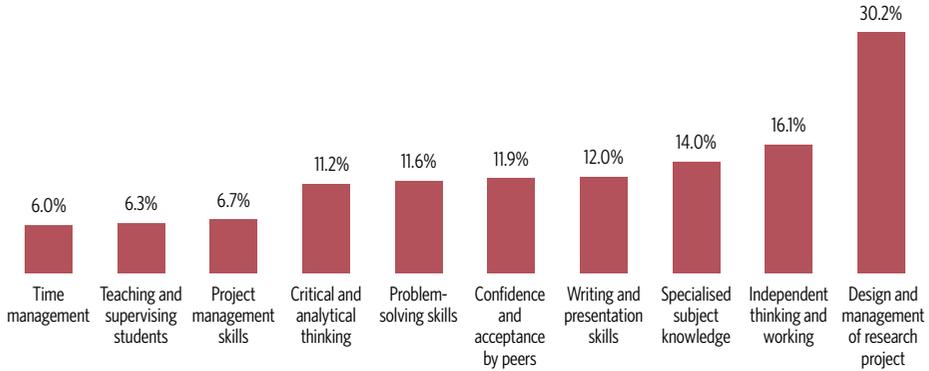
In a web-based survey conducted between March and June 2009 for ASSAf as part of the PhD in South Africa study (Mouton 2009), slightly more than 5 000 e-mails were sent to doctoral graduates at 15 South African universities requesting them to complete a web-based questionnaire. A total of 1 076 completed questionnaires were received. This translates into a return rate of about 22% for the entire survey (253 e-mails were invalid).

One of the questions that were put to respondents that is particularly relevant to our discussion is whether they felt that their doctoral degree had prepared them for employment. It was found that the majority of respondents across all fields felt that their doctoral qualification prepared them well or very well for employment.

PhD graduates who indicated that their doctoral degree did indeed prepare them for employment were also asked to explain in what way the qualification prepared them for employment. The top ten reasons mentioned are displayed in Figure 5.8. The ability to design and manage a research project was considered the most important preparation for employment. This is closely linked to the ability to think and work independently. Having specialised subject knowledge also opened and eased the entry into employment for a number of PhD graduates. It would also seem that a doctoral qualification provided confidence and acceptance into the scientific world for some of the respondents.

These results are consistent with the CREST Tracer study (Mouton et al. 2012). The findings of that study show that vast majorities of graduates in

Figure 5.8: How doctoral studies prepared students for the world of work (2009)



Source: Mouton 2009

all fields indicate that their current employment utilises their knowledge and skills either to some degree or to a significant extent (93.1% in SSHA, 96.6% in EMS and 95.8% in NEHS). This is a significantly positive finding as far as SSHA graduates are concerned as it shows convincingly that the ‘fit between knowledge/skills and employment is equally good across all fields of study’ [Mouton et al. 2012: 50]. The results do not support (a popularly held view) that the university preparation of SSHA graduates is less relevant to a future place of employment than is the case for graduates in other fields of science. Within the SSHA 54% of graduates from professional disciplines as against 40% from academic disciplines indicated that their current employment utilises their knowledge and skills to a significant extent. These findings are also consistent with a study (much smaller in scale) conducted by Griesel and Parker in 2008 amongst employers in the private sector.

Although South African higher education does not have an abundance of tracer or destination studies, the few studies (with reasonable sample sizes) consistently present the same results: vast majorities of South African graduates and especially doctoral graduates who do not have employment on completion of their studies find employment quite quickly. There is nearly no unemployment of doctoral graduates to speak of. Studies of doctoral graduates and employers also concur that there is acceptable alignment between the demands of the workplace and the skills and competencies of the graduates. Although these are indirect measures, the picture that emerges from all of these studies (Botha 2015) provides

positive evidence for the quality of the doctoral degree and candidate in the country.

In conclusion

Our discussion of quality in doctoral education and the challenges in measuring quality has been limited to those ‘dimensions’ for which there is readily available data. Although this is clearly a limiting factor that needs to be kept in mind when drawing conclusions about how good or bad doctoral education is in the country, we would also suggest that most of the measures that were used point to the same conclusion: that general doctoral education in South Africa is of an adequate quality. We have presented evidence that shows that:

- There are fairly stringent policies and rules in place to ensure proper accreditation of doctoral programmes.
- The HEQC has ensured – to a large extent – that universities conform to standard practices in quality assurance of doctoral education (including registration, supervision and examination processes).
- The fact that majorities of doctoral students work while they study impacts on their levels of preparedness for doctoral studies. Various studies confirm that doctoral candidates typically require a large degree of help and support in coping with the demands of doctoral education. This has also meant that universities – at least in most cases – are screening and selecting potential doctoral candidates more stringently and rigorously in order to ensure that the best pool of talent is accessed for doctoral studies. However, we would maintain that the part-time nature of doctoral studies for many students poses one of the major challenges to maintaining high standards of doctoral education in the country.
- We have presented evidence that suggests that the quality of doctoral supervisors and supervision is generally good. Again, however, the increasing burden of supervision (which is linked to the demands for growth and efficiency) is cause for concern (amongst many supervisors) and an additional factor that may compromise the quality of doctoral education. Increasingly, supervisors have to take on larger numbers of students as well as – in many cases – students in areas falling outside their own expertise.
- Doctoral tracer studies show that South African doctoral graduates do not find it difficult to find employment (keeping in mind that about 60% are already employed at the time of study). These studies, as well as employer studies, indicate that there is a reasonable fit between the

demands of the labour market and the knowledge and skills presented by the doctoral graduate.

Our overall assessment, then, is that the quality of doctoral education in South Africa is generally good. However, at the same time we need to caution against any complacency as there are already isolated indications of strains on the system, which may in the long run compromise quality. The imperative to improve quality is and should be an essential goal of any system of doctoral education.

Notes

- 1 The National Qualifications Framework is a comprehensive system approved by the minister for the classification, registration, publication and articulation of quality-assured national qualifications (SAQA 2008).
- 2 For a detailed, qualitative analysis of the different study trajectories of doctoral students, see Backhouse (2009).