The PhD conundrum in South African academia

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Abstract

South African universities need more academics with PhDs, from historically disadvantaged population groups in particular, but they face a conundrum. In order to have more staff with PhDs, they need to produce more PhD graduates. But in order to produce more PhD graduates, they need more staff with PhDs to supervise. This article explores this conundrum by comparing academic qualifications with national policies and targets, by developing a quantitative profile of staff without PhDs and describing government and institutional measures to improve academic qualifications. An institution's supervisory capacity is found to be closely related to institutional history. Four main factors are identified: (a) whether or not the institution was originally established as a traditional university or as a technikon; (b) whether or not it was advantaged or disadvantaged under apartheid, which was closely related to the racial group for which it was established; (c) whether or not it was merged post 2004; and if so, (d) with what type of institution it was merged.

1 INTRODUCTION

The importance of the PhD in a country with – or aspiring to have – a knowledge economy is widely argued. The PhD, it is said, is not only essential for an academic position, it also plays a crucial role in the economy more broadly – equipping doctoral graduates with essential, transferable skills (Nerad, Trazyna & Heggelund, 2008). It is not surprising therefore that many African countries are trying to step up their PhD production. South Africa is no exception (Academy of Science of South Africa (ASSAf), 2010). There is one major stumbling block however. You need academic staff with PhDs to supervise PhD candidates. But many universities on this continent do not have sufficient PhD-qualified staff to meet the demand for doctoral supervision (Tettey, 2010; Harle, 2011; Cloete, Mouton and Sheppard, 2015; Moss, 2016). This is the 'conundrum' (MacGregor, 2013) that faces many African universities including at least half of the 23 higher education institutions in South Africa where only 43% of permanent academic staff had PhDs in 2014, with proportions ranging from 11% to 67%. Since South Africa aspires to become a hub of doctoral education in the region (NPC, 2011:289; Cloete, Sheppard and Bailey, 2015), the importance of this article goes beyond the country borders.

In this article, South African statistics on numbers of staff with PhDs in 2014 are compared with national policies and targets and statistics on PhD graduates. A quantitative profile of staff without PhDs is developed – including their institutional location, demographics (race, gender and nationality) and field of expertise. Government and institutional measures to improve academic qualifications are described. The statistics are presented according to the current 'official' classification of higher education institutions but in the penultimate section of the paper, this classification is reconsidered and an alternative is

suggested that provides a more accurate reflection of historical legacy and current capacity. The paper concludes with a brief overview and suggestions for further research.

Note that the term PhD is used interchangeably with doctoral degree. We include professional doctorates as well as the more traditional Doctorate of Philosophy. The qualification is usually the highest conferred by a university and is usually preceded by a Master's degree.

For the purposes of this article the institutions established after 2014 are excluded. 2014 figures were the most recently available official figures at time of writing

2 The international context

Upgrading staff qualifications is a common trend in many countries including Southern Africa, East Asia and Latin America (Jorgensen, 2012). According to Jorgensen, 33% of staff had a doctorate in 28 sampled institutions in Southern Africa in 2012, compared with 31% of staff in 29 institutions in Latin America and 49% of staff in 28 institutions in East Asia. Jorgensen's data indicates that in 2012 half of the academics in the Southern Africa region were in South Africa. He maintained that some countries were worse off than others, e.g. Zambia which had only 122 doctoral graduates teaching in the Science, Engineering and Technology (SET) subjects, Namibia 33 PhD SET academics, and the high population Democratic Republic of Congo had 107 SET academics. Jorgensen argues that since many of those that leave their country to purse their doctoral studies do not return, this leads to a further strengthening of already research-intensive universities at the expense of those struggling to achieve critical mass of research to develop their capacity (Jorgensen, 2012, 45).

Another study of eight flagship universities in Africa showed that proportions of permanent academic staff with doctoral degrees was below 50% in five universities in 2011, with the exception of University of Botswana, University of Cape-Town and the University of

Ghana (Bunting, Cloete & Van Schalkwyk, 2013).

The percentage of academics without PhDs was also a concern in UK Higher Education Institutions. In 2010-2011 only 58.4% of full-time academics in the UK possessed a PhD in contrast to only 21.8% for part-time academics. Institutions that were founded before 1992 in the UK had more staff with PhDs (eg. University of Cambridge had 59,8% of full time staff with PhD and 34,6% of part-time staff with PhD) (Grove, 2012).

3 Doctoral education in South Africa

The long divided and discriminatory history of higher education in South Africa formed a barrier to the production of knowledge and excluded the majority of the population from studying for higher degrees. Black (African, Coloured and Indian) students were relegated to institutions set up for their particular racial groups and Technikons (polytechnics), set up to focus on technical and vocational education, were prohibited from offering masters and doctoral degrees. After the transition to democracy in 1994, there were concerted attempts to increase postgraduate enrolments of black and female students in particular. Furthermore, in 2001/2 the government set about a merger process aimed at reducing the number of higher education institutions. This was done as a means to remove the apartheid racial classification of higher education institutions, to redistribute resources and to bring historically disadvantaged institutions which were isolated and on the periphery of scholarship into the hub of academic life. The mergers and incorporations reduced the number of higher education institutions from 36 to 23. Three types of institution were subsequently created: traditional universities, universities of technology (the old technikons) and new comprehensive universities combining both types of education (Table 1). All institutions were now able to award degrees including doctorates.

Table 1: The South African higher education landscape

Classification, institutional name + date of establishment	Abbr.	Merged Institutions
Traditional universities		
University of Cape Town – 1829(1918)*	UCT	
University of Fort Hare – 1916(1970)*	UFH	
University of the Free State – 1904(1950)* (changed its name from the University of Orange Free State (UOFS) in 2001)	UFS	
University of KwaZulu-Natal (est. 2004)	UKZN	University of Natal – 1910(1948)* University of Durban-Westville (UDW) – 1961(1971)*
University of Limpopo (est. 2005)	UL	University of the North (UN) – 1959(1970)* Medical University of South Africa (MEDUNSA) (1978)
North-West University (est. 2004)	NWU	University of North-West (Formerly the University of Bophuthatswana) – (1960?) Potchefstroom University for Christian Higher Education (PU for CHE) – 1919(1951)*
University of Pretoria – 1908(1930)*	UP	
University of Stellenbosch - 1866(1918)*	US	
Rhodes University – 1904(1951)*	RU	
University of the Western Cape – 1959(1970)*	UWC	
University of the Witwatersrand – 1904(1922)*	WITS	
Universities of Technology		
Cape Peninsula University of Technology (est. 2003)	CPUT	Cape Technikon (1920) Peninsula Technikon (1962)
Central University of Technology, Free State (est. 2004)	CUT	Technikon Free State (1981) Vista University (Welkom campus)
Durban University of Technology (est. 2002 as Durban Institute of Technology. Changed name in 2006.)	DUT	Technikon Natal (1907) ML Sultan Technikon (1941) University of Zululand (Umlazi campus)
Mangosuthu University of Technology – 1979	MUT	
Tshwane University of Technology (Est. 2004)	TUT	Technikon Northern Gauteng Technikon North-West Technikon Pretoria
Vaal University of Technology (est. 2004)	VUT	Vaal Triangle Technikon (1979–2003)
Comprehensive universities		
University of Johannesburg (est. 2005)	UJ	Rand Afrikaans University (RAU) – 1968 Technikon Witwatersrand Vista University (Johannesburg campuses)
Nelson Mandela Metropolitan University (est. 2005)	NMMU	PE (Port Elizabeth) Technikon (1979) University of Port Elizabeth (UPE) (1964) Vista University (Port Elizabeth campus) (1982)

University of South Africa – 1916(1951)*	UNISA	UNISA Technikon South Africa (TSA) VUDEC – Vista University Distance Education Centre
University of Venda – 1982	UV	
Walter Sisulu University (est. 2005)	WSU	University of the Transkei (UNITRA) (1976–2004) Border Technikon Eastern Cape Technikon
University of Zululand – 1961(1970)*	UZ	

Source: Herman, 2015.

Note: Universities ordered alphabetically within category.

*First date refers to the establishment of the institution. Second date in parentheses refers to the year when the university was granted independent status enabling it to award doctoral degrees

Since the mergers there has been substantial growth in the numbers of doctoral graduates. The output nearly doubled (90% increase across all institutions) between 2005 and 2014. In 2014 South Africa increased its PhD production to 34 PhDs per million of the population. However, this figure is still low in comparison with other developing countries, such as Portugal (277 PhDs per million of population) and Brazil (70 PhDs) (UNESCO, 2015)

The National Development Plan has set a target of 100 million doctoral graduates per year by 2030 which translates to 5000 new PhD graduates per year.

Table II indicates that knowledge production is not evenly distributed in South Africa and is skewed towards the historically advantaged universities. Nine such institutions, out of total of 23, produced 79% of all doctoral graduates in 2014. In the 10-years period from 2005 to 2014, selected universities of technology and previously disadvantaged universities, such as Fort Hare, showed a significant increase in the number of graduates, albeit from a very low base.

Table 2: Doctoral graduates from South African higher education institutions in 2005 and 2014 with percentage change

		2005	2014	% change
Traditional universities				
University of Cape Town	UCT	182	204	12%
University of Fort Hare	UFH	1	66	6500%
University of the Free State	UFS	65	104	60%
University of KwaZulu-Natal	UKZN	96	264	175%
University of Limpopo	UL	15	25	67%
North-West University	NWU	82	171	109%
University of Pretoria	UP	192	237	23%
Rhodes University	RU	31	76	145%
University of Stellenbosch -	US	126	234	86%
University of the Western Cape	UWC	35	104	197%
University of the Witwatersrand	WITS	101	199	97%
Universities of Technology				
Cape Peninsula University of Technology	CPUT	6	17	183%
Central University of Technology	CUT	6	12	100%
Durban University of Technology	DUT	4	18	350%
Tshwane University of Technology	TUT	12	46	283%
Vaal University of Technology	VUT	2	1	-50%
Comprehensive universities				
University of Johannesburg	UJ	88	106	20%
Nelson Mandela Metropolitan University	NMMU	30	72	140%
University of South Africa	UNISA	92	268	191%
University of Venda	UV	3	1	-67%
Walter Sisulu University	WSU	1	8	700%
University of Zululand	UZ	18	25	39%
All institutions		**1188**	**2258**	**90%**

Source: Higher Education Management Information System (HEMIS)

The growth exceeded expectations. In 2012, Prof Goolam Mohamedbhai, then Secretary-General of the Association of African Universities, stated that the NDP target of 5,000 new PhDs per year by 2030, was an unrealistic figure and predicted that only about 2,100 students would be graduating in 2020 (Mohamedbhai, 2012). But Mohamedbhai's figure was exceeded in 2014 when there were 2,258 PhD graduates, suggesting that the NDP figure is not beyond reach. It is evident that whether the target is realistic or not depends on supervisory capacity - the extent to which the system is able to absorb and graduate more PhD students. The supervisory capacity depends on a number of factors, namely, the number of staff with doctorates, the number of doctoral graduates who go into academia or were already in academic

positions at the time of their studies; and the system capacity to replace the supervisors who are due to retire. While universities have different policies with regard to retirement age which could be 60 or 65, it is estimated that about 30% of the Professor and Associate professor, as well as 19% of senior lecturers across the universities will be retired by 2020 (DHET, 2015). This means that in order to supervise the growing number of students as well as to counteract the expected retirement of current academics in the next decade, the higher education system in South Africa has to recruit about 1232 new academics per annum to ensure renewal of the academic force (Department of Higher Education and Training (DHET), 2015).

The following section considers growth in supervisory capacity and concludes that PhD production has seldom been matched by similar growth in staff with PhDs. This suggests that quality might have been an issue.

3.1 Growth in PhD-qualified staff vs PhD production

In 2005 only 30% of academics in South African public institutions had doctoral degrees. Five years later, the figure had inched to 34% and the National Planning Commission set an ambitious target: 75% of permanent academic staff to have doctoral degrees by 2030 (NPC, 2011). By 2014 the percentage had risen to 43%, a 43% increase in the proportion of staff with PhDs since 2005 and a 70% increase in their numbers. (Table 3)

Table 3: Headcount permanent academic staff with doctoral degrees in South African public universities, 2005 and 2014

	2005			2014			2005 - 2014	
Institution	**Total academic staff**	**Academic staff with doctorates**		**Total academic staff**	**Academic staff with doctorates**		**Growth in numbers of staff with doctorates**	
	n	**n**	**%**	**n**	**n**	**%**	**n**	**%**
Traditional universities								
UCT	829	385	46%	1149	772	67%	387	100%
UFH	230	28	12%	334	142	43%	114	407%
UFS	620	317	51%	986	413%	42%	96	30%
UKZN	1448	479	33%	1348	670	50%	191	40%
UL	804	118	15%	941	154	16%	36	31%
NWU	769	178	23%	1342	699	52%	521	293%
UP	1575	677	43%	1176	724	62%	47	7%
RU	306	147	48%	351	191	54%	44	30%
US	818	350	43%	1035	639	62%	289	83%
UWC	465	199	43%	615	332	54%	133	67%
WITS	952	407	43%	1074	661	62%	254	62%
Universities of Technology								
CPUT	621	66	11%	774	155	20%	89	135%
CUT	203	36	18%	295	96	33%	60	167%
DUT	537	29	5%	579	112	19%	83	286%
TUT	880	101	11%	951	217	23%	116	115%
VUT	312	31	10%	378	60	16%	29	94%
Comprehensive Universities								
UJ	917	203	22%	1104	478	43%	275	135%
NMMU	557	174	31%	604	278	46%	104	60%
UNISA	1308	481	37%	1718	690	40%	209	43%
UV	268	87	32%	372	129	35%	42	48%
WSU	531	31	6%	591	84	14%	53	171%
UZ	219	84	38%	285	102	36%	18	21%
TOTAL	15169	4608	30%	18192	7818	43%	3210	70%

Source: HEMIS

A comparison of the increases in the number of PhDs produced with growth in numbers of staff with PhDs provides a sobering picture (Table 4). At only three of the institutions was there a higher growth in proportion of staff with PhDs than PhD graduates. At UCT there was a 100% increase in staff with PhDs (from 385 to 772) compared with a 12% growth in PhD graduates (from 182 to 204). At Central University of Technology (CUT), the numbers of staff with PhDs grew from 36 to 96 (167% increase) and doctoral

graduates doubled, albeit from a very small base (six to 12). At University of Johannesburg, the numbers of staff with PhDs increased from 203 to 478 (an increase of 135%) while doctoral output increased from 88 to 106 (20%). Durban University of Technology (DUT) achieved a 286% increase in staff with doctoral degrees (from 29 to 112) and an even higher percentage increase in doctoral output although, once again it was from a very low base – from 4 to 18, an increase of 350%.

Table 4: Comparison of growth in PhD production and numbers of academic staff with PhDs, 2005-2014

Type of institution	Name (abbreviation)	% growth in annual PhD production, 2005-2014	% growth in numbers of staff with PhDs, 2005-2014
Traditional universities	UCT	12%	100%
	UFH	6500%	407%
	UFS	60%	30%
	UKZN	175%	40%
	UL	67%	31%
	NWU	109%	293%
	UP	23%	7%
	RU	145%	30%
	US	86%	83%
	UWC	197%	67%
	WITS	97%	62%
Universities of Technology	CPUT	183%	135%
	CUT	100%	167%
	DUT	350%	286%
	MUT		N/A
	TUT	283%	115%
	VUT	-50%	94%
Comprehensive Universities	UJ	20%	135%
	NMMU	140%	60%
	UNISA	191%	43%
	UV	-67%	48%
	WSU	700%	171%
	UZ	39%	21%
	TOTAL	90%	70%

Source: HEMIS

In contrast Fort Hare, which recorded the highest proportional increase in PhD graduates (from 1 to 66, an increase of 6500%), had a much smaller increase in the numbers of staff with PhDs (from 28 to 142, a growth of 407%). North West University which

achieved the second highest increase in numbers of staff with doctorates (293%, from 178 to 699) had a 109% increase in numbers of doctoral graduates – from 82 to 171.

Further qualitative research which is beyond the scope of This article is necessary to determine the reasons for these trends. It is likely there were a number of different factors: a university might have acquired more doctorally qualified staff with a merger, or they might deliberately have recruited staff with doctoral degrees or they might have had a targeted programme to improve the qualifications of existing staff. What is clear is that an increase in staff with PhDs does not necessarily produce a corresponding increase in PhD graduates, suggesting variations in productivity, as well as questions of time lag, in the case of newly appointed staff. Conversely, a large increase in PhD output is not necessarily associated with an increase in PhD-qualified staff. Such an increase could signal an increase in productivity, but could equally be a warning sign that supervisory capacity is under strain and quality of the PhD itself might be at risk.

3.2 Profile of staff without PhDs

The following section focuses on staff without doctoral degrees**,** the target 'market' for a wide range of government and institutional initiatives. A quantitative profile of these academics is developed. A good understanding of the profile of these academics and of the institutions in which they are located is necessary in order to ensure the best possible policies and interventions.

3.3 Demographic profile

In the South African context, it is not sufficient for the system to merely improve the proportion of staff with PhDs, this improvement needs to align with the county's equity and

redress policies. This means that there needs to be substantial growth in the numbers and proportions of black African South African staff with PhDs in particular.

The South African National Research and Development Strategy (NRDS) (DST, 2002) which focused on the renewal of science and technology workforce raised concerns about what has been described as 'frozen demographics', that is, the context whereby the 'human resources for science and technology [were] not being adequately renewed', and 'an overwhelmingly white, male and ageing scientific population [was] not being replaced by younger groupings more representative of [South African] demographics' (p.15). A report by Higher Education South Africa (HESA) (2011) indicates that while some progress has been made toward greater representation of African and female academics with PhDs, they remained a minority in the academia by 2009.

The National Development Plan (NPC, 2011, p.268) called for a diverse and differentiated system that also takes account of social justice and equity imperatives and required universities to be "welcoming and supportive environments for black and female students and researchers…. Women and Africans [should] each make up more than 50 percent of research and teaching staff.'

Table 5 considers the demographic profile of academics without doctoral degrees in 2014.

Table 5: Percentage of permanent academic staff without PhDs, by population group and gender, 2014

	Female						Male					
	Population Group						Population Group					
Institution	**A**	**C**	**I**	**N/I**	**W**	**Total Female**	**A**	**C**	**I**	**N/I**	**W**	**Total male**
Traditional Universities												
UCT	40%	57%	53%	30%	38%	41%	19%	39%	18%	18%	26%	26%
UFH	74%	75%	67%	40%	69%	67%	77%	44%	44%	33%	45%	52%
UFS	72%	54%	67%		61%	62%	64%	50%	89%		51%	54%
UKZN	73%	72%	57%	23%	50%	58%	62%	79%	49%	20%	36%	44%
UL	90%	100%	75%		78%	87%	82%	100%	90%		68%	81%
NW	67%	50%	86%		53%	56%	51%	27%	50%		37%	41%
UP	57%	57%	41%	0%	43%	46%	33%	40%	30%	50%	31%	31%
RU	70%	45%	55%		50%	53%	37%	67%	75%		37%	40%
UWC	50%	68%	50%	33%	43%	54%	56%	48%	65%	17%	35%	38%
WITS	46%	46%	58%		43%	46%	29%	50%	37%		32%	32%
Universities of Techology												
CPUT	72%	88%	54%		83%	82%	72%	87%	64%		80%	79%
CUT	79%	100%	50%		66%	71%	66%	0%	60%		69%	65%
DUT	88%	100%	80%	50%	87%	85%	84%	56%	75%	56%	82%	77%
MUT	98%	100%	89%		100%	97%	87%		79%		100%	86%
TUT	87%	100%	67%		74%	80%	76%	56%	86%		73%	75%
VUT	94%	100%	88%		80%	87%	80%		88%		85%	82%
Comprehensive Universities												
UJ	71%	83%	70%		57%	63%	58%	63%	58%		44%	51%
NMMU	47%	69%	40%		55%	55%	58%	68%	36%		51%	53%
UNISA	71%	63%	83%		61%	66%	62%	37%	58%		44%	54%
UV	73%	100%	100%		50%	73%	63%		0%		60%	61%
WSU	91%	83%	81%		93%	90%	83%	75%	75%		83%	82%
UZ	77%	-	64%		60%	73%	57%	100%	56%		61%	58%
TOTAL	**76%**	**70%**	**65%**	**30%**	**55%**	**63%**	**65%**	**57%**	**58%**	**24%**	**43%**	**53%**

Source: HEMIS

The race and gender figures show that women academics are less likely to have doctoral degrees than men, with African women at the lowest end of the spectrum and white men at the top end. A surprising number of staff (82 women and 331 men) fall within a category which HEMIS calls ‘no information’, indicating that they were not prepared to state ‘race’. This might be because the figures include international staff who would not be required to classify themselves in their own countries as well as staff who deliberately flout the practice of racial classification, either because they oppose the concept of race (a widely contested concept in the Western Cape) or see no advantage for themselves in doing so.

Given the low proportion of staff without doctoral degrees in the 'no information' category (30% of female 'no information's and 24% of male) and the alignment of this trend with white females and males, it is likely that a sizeable number of these staff are white.

In all gender categories, there were fewer men without doctoral degrees than women, ranging from 41% female without PhD at UCT compared with 26% male to 87% female at Limpopo compared with 81% male. African females formed the largest group of academics without doctorates (1779 out of 2329 or 76%) followed by Coloured females (403 out of 578 or 70%), Indian females (at 503 out of 775 – 65%), White females (2503 out of 4450 or 55%) and women categorised as 'no information' (25 out of 82 or 30%). Among African men, 2398 out of 3689 (65%) did not have doctorates, followed by Indian men (448 out of 758 or 58%), Coloured men (332 out of 587 or 57%), white men (1969 out of 4571 or 43%) and 'no information' males (80 out of 331 or 24%).

3.4 Nationality

The nationality of staff is an important consideration in the South African context. Universities have to comply with employment equity legislation which requires them to prioritise South African blacks in their appointments where possible. Table 6 shows that while 88% of staff at South African universities overall in 2014 were South Africans, 60% of these South Africans did not have PhDs. In contrast only 33% of the international staff did not have PhDs, with those from outside the African continent more likely to have PhDs than those from elsewhere on the continent. Employing black international staff with PhDs from elsewhere in the continent usually goes some way towards improving the diversity of South Africa academia but does not help the universities meet their equity targets.

Table 6: Numbers and percentages of permanent academics without doctoral degrees by nationality, South Africa higher education institutions, 2014

	Total Academic	South African	% of SA Academics	Total academics without PhD	South African without PhD	% of South African without PhD	International	International without PhD	% of international without PhD
Traditional universities									
UCT	1149	861	75%	377	333	39%	288	44	15%
UFH	334	259	78%	192	164	63%	75	28	37%
UFS	986	946	96%	573	551	58%	40	22	55%
UKZN	1348	1144	85%	678	632	55%	204	46	23%
UL	941	883	94%	787	749	85%	58	38	66%
NWU	1342	1265	94%	643	622	49%	77	21	27%
UP	1176	1056	90%	452	425	40%	120	27	23%
RU	351	297	85%	160	148	50%	54	12	22%
US	1035	936	90%	396	366	39%	99	30	30%
UWC	615	516	84%	283	263	51%	99	20	20%
WITS	1074	776	72%	413	357	46%	298	56	19%
Universities of Technology									
CPUT	774	710	92%	619	582	82%	64	37	58%
CUT	295	266	90%	199	179	67%	29	20	69%
DUT	579	550	95%	467	449	82%	29	18	62%
MUT	190	168	88%	170	153	91%	22	17	77%
TUT	951	870	91%	734	696	80%	81	38	47%
VUT	378	324	86%	318	275	85%	54	43	80%
Comprehensive Universities									
UJ	1104	954	86%	626	571	60%	150	55	37%
NMMU	604	585	97%	326	319	55%	19	7	37%
UNISA	1718	1583	92%	1028	971	61%	135	57	42%
UniVenda	372	286	77%	243	206	72%	86	37	43%
UZ	285	256	90%	183	169	66%	29	14	48%
WSU	591	559	95%	507	481	86%	32	26	81%
Total	**18192**	**16050**	**88%**	**10374**	**9661**	**60%**	**2142**	**713**	**33%**

Source: HEMIS

University of the Witwatersrand (WITS) and UCT have the highest percentage of international academic staff from outside Africa. At WITS 143 academics (13% of total) were from Africa in 2014 and of these, 24% did not have PhDs, while 155 academics (14% of total) were from the rest of the world and just 14% were without PhDs. At UCT 72 (6% of total) of the academics were from Africa and 25% of them did not have PhDs, while another 216 academics (19% of total) came from the rest of the world and only 12% did not have PhDs. In

comparison 46% of South African academics at Wits and 39% of South African academics at UCT did not have PhDs. UniVenda also had a high percentage of international academics, mostly from Zimbabwe, Kenya, Nigeria and Ghana, and only 26% did not have a PhD compared with 72% of South African academics without a PhD. A similar scenario can be viewed at the University of Fort Hare where foreign staff members tend to be mostly senior academics and amongst the most prominent researchers at the University (University of Fort Hare, Council on Higher Education audit report, 2009).

3.5 Academic field or discipline

An important consideration is the field in which doctorally qualified staff are most prevalent. It is difficult to determine the exact disciplinary trends across all universities as this information is not readily available. The DHET classifies disciplines according to FTEs (Full-time Equivalent) per CESM category (Classification of Educational Subject Matter) but FTEs do not necessarily align with headcount. One needs to obtain individual institutional data to determine headcount. However, faculty proportions can give one a general sense of trends. For example, at UP, staff with doctoral degrees ranged from 42% in Veterinary Science to 95% in Theology. At UCT proportions of staff with doctoral degrees ranged from 50% in Commerce and Law to 93% in the Science Faculty.

The ASSAf (2010) report indicates that the number of permanent academic staff with doctoral qualifications at public higher education institutions in South Africa is highest in the natural and agricultural sciences and the social sciences. The engineering sciences, materials and technologies as well as health sciences have the lowest number of academics with PhDs.

Although both the Department of Science and Technology and the National Planning Commission have emphasized the need for more PhDs in the SET fields, they have not specified disciplines for their academic staff targets, suggesting that academics of all

disciplines are expected to have PhDs. Whether this is feasible or even desirable is a moot point which should be investigated further.

Higgins (2016:311) also questions the focus on PhD production and the importance of the PhD for all academic staff in 'highly specialized programmes in which industrial or professional expertise is more apposite than deep academic disciplinary knowledge' or in programmes graduating students with diplomas 'where the PhD as a requirement for academic appointment may inadvertently lead to academic attrition and make the career less attractive … particularly where the immediate salary benefits are better elsewhere'.

3.6 Part-time versus full-time study

Whether a doctoral candidate is studying full-time or part-time is a crucial factor in determining their likelihood of graduating and within what time period. Unfortunately, the DHET data available is insufficient to allow such a comparison across all universities. Cloete, Mouton and Sheppard (2015), conducted a national survey of postgraduate students at South African universities in 2014, receiving 5 700 completed questionnaires. They found that the 'core and determining feature of doctoral education in South Africa is the fact that 60% of all students enroll for their studies while they work. For the humanities this proportion is 75%; for the natural sciences 55%' (2015:72). This was the major factor affecting low progression and retention rates and why doctoral students are much older than their counterparts in Europe – typically about 35 years old when enrolling for a doctorate and 41 years when graduating.

Cloete, Mouton and Sheppard (2015) did not explore the type of work which doctoral students are doing but it is likely, given the low proportions of academic staff with PhDs, and the current emphasis on attaining this qualification, that many of those studying towards doctoral degrees are already employed at universities as academic staff. If this is the case then a number of questions arise. Of all employers, universities should have the greatest need for

staff with doctorates. Universities also benefit from the research which any doctoral student undertakes. Why then do they not make more full time study opportunities for these staff? If they are not in a financial position to do so, and the academic staff member is having to study part-time, one can still wonder why they are not able to achieve their doctorates more easily, given the intellectual resources, including library and laboratory access, which a university position accords. Are these staff overloaded with teaching and administration? Or are they merely complacent? Could it be that having achieved an academic position without a PhD, they might not feel any urgency to attain one? These are some of the questions which the authors of This article are raising in a further qualitative study involving interviews with academics without PhDs.

3.7 National initiatives to improve staff qualifications

The South African Department of Higher Education took a surprisingly long time to realise the importance of staff qualifications. Both the White Paper 3 of 1997 which outlined 'A programme for the transformation of higher education in South Africa' and the 2001 National plan for Higher Education in SA (DoE, 2001) emphasised the need to increase numbers of masters and doctoral graduates but did not broach the issue of staff qualifications or supervisory capacity. The Department of Science and Technology, in its White Paper on Science and Technology (1996) also ignored the issue of staff qualifications but did find that the historically disadvantaged institutions (HDIs) had very limited research capacity due to their focus on teaching as opposed to research and development' and resolved to improve 'the HDI's capacity to perform R & D' and provide funding that would 'stimulate the development of S & T' and target 'black and female students in these fields of study' (Chapter 9, Section 4).

The National Research Foundation (NRF) took up the challenge and in 2001 introduced the Thuthuka programme for early career academics primarily from the designated groups defined as black (African, Coloured, Indian), female and disabled. ('Thuthuka' is a Zulu word, meaning 'to develop'.) The aims of the Thuthuka programme include promoting the attainment of a doctoral qualification by early career academics (in general), promoting the attainment of NRF rating by early career academics in the designated groups and effecting a transformation of the demographic composition of the established research community at publicly funded universities and research institutions. In order to address past inequalities, 80% of all funded grant holders in the PhD track have to be black; and up to 60% female. (NRF, March 2016). During the 2014/15 reporting period a total of 662 students benefited from this funding. Of the recipients, 59% were female and 69% were black, a shortfall of 11% on its equity target (NRF, 2015). A World Bank/OECD (2016) review found that the *Thuthuka* programme has not attracted enough black applicants and there is a high failure rate among Black applicants at the review stage.

Similarly, the NRF shifted funds from established researchers to the next generation researchers and emerging researchers through awarding bursaries, scholarships, and grants on a competitive basis to students undertaking full-time studies. From 2010/11-2014/15 the total investment in this area grew by 87% to R2bn to build capacity within the pipeline towards a future generation of researchers who can be assisted to become established researchers (NRF, 2015:63).

The NRF introduced a programme to 'Improve Academic Qualifications of Academic Staff and Researchers' in 2010, with further funding from DST from 2013 (NRF, 2016b). For the 2014/15 financial year R10 million (nearly £119,000) was allocated to this programme. The aims of the programme are to accelerate the doctoral level training of full-time academic staff

at public universities and research institutions; improve the academic qualifications of employed academics to enhance research and supervisory capacity; and to effect a rapid transformation in the demographic composition of the emerging researcher community with respect to gender, race and persons with disabilities. Through this programme academic staff may take sabbatical leave of between 6 and 12 months in order to complete their doctorates. The programme is only open to South African citizens (NRF, 2015).

The DHET has also initiated a programme to enhance and transform the demographics of South African academics. The programme, Staffing South Africa's Universities (SSAUF), includes four core programmes aimed at ensuring that there is a constant cycle which replaces ageing and retiring academics and mentors with emerging scholars. The New Generation Academics Programme (nGAP) supports the creation of new permanent academic posts for emerging, mainly black scholars including promising PhD candidates. The posts, which are fully funded by DHET for three years with partial funding for three years thereafter, are in great demand. In Phase 1 (2015/16), universities submitted applications for 500 nGAP posts but only 125 were made available across all 26 universities. The other three core programmes, still to be implemented, are the Nurturing Emerging Scholars Programme (NESP), the Existing Academics Capacity Enhancement Programme (EACEP) and Supplementary Staff Employment Programme (SSEP) (DHET, 2015). These programmes will be implemented from 2018 when the new University Capacity Development Programme (UCDP) comes into effect. This programme combines the Research Development Grant and the Teaching Development Grant, which both expire this year (2017), into a single University Capacity Development Grant (UCDG) from which the nGAP programme will also be funded. The UCDG effectively reduces funding for both teaching and research development and could have a negative impact on the ability of universities to support academics to improve their qualifications ? a primary purpose of the Research Development Grant.

The South African priority to increase the number of academics with PhDs is also supported by a range of national and international organisations and funders. There are multiple initiatives aimed specifically at upgrading staff qualifications and providing support for doctoral students. A report compiled for the Association of Commonwealth Universities (Harle, 2013) suggests that while there are many initiatives to support African students, these are dispersed and relatively fragmented. Subsequently, there have been many small schemes offering few rewards. A comprehensive list of these initiatives and their analysis requires extensive research.

In South Africa at least these initiatives seem to have had a positive impact on the qualifications of academics which, as has been indicated before, increased by 13 percentage points or 70% between 2005 and 2014.

3.8 A note on the classification of universities in South Africa

In this article so far we have used the current 'official' classification of South African universities into traditional, comprehensive and universities of technology. Yet each category contains outliers which suggest that this classification might not be the most useful to follow in order to analyse the national trend of academics with PhDs. For example, the proportions of staff with PhDs at the traditional universities averaged 51% but ranged from 16% to 67%. Among the universities of technology, percentages of staff with doctoral degrees in 2014 ranged from 11% to 33% (average 20%). Among the comprehensive universities, proportions of staff with PhDs ranged from 14% to 46% (average 36%).

Cooper (2015) has developed a useful three band distinction which distinguishes universities on the basis of the level of research intensity based on masters and doctoral production and research publications. See columns 1 and 2 of Table 7. In the upper band are

historically white universities and in the lower band historically black universities and universities of technology. A significant characteristic of the middle band is that they were formerly white institutions that experienced very rapid expansion of numbers of African South African students since the 1980s. Cooper says they were 'all at their core previously historically white and most of them formerly Afrikaans medium)' and 'had (or would soon have) a clear majority of South African African students, compared to their nearly 100% white student populations in the 1980s era of apartheid' (Cooper, 2015:257). Exceptions are the University of the Western Cape and University of Fort Hare. As historically black universities one might expect them in the lowest band but their performance placed them in the middle band, on a par with University of the Free State and Nelson Mandela Metropolitan University respectively.

Table 7: An alternative classification of public universities in South Africa

Band	Cooper's categorisation according to level of research intensity' based on masters and doctoral production and research publications in 2012. [1]	Categorisation according to percentage of staff with doctoral degrees in 2014
Upper	US, UCT, Wits, UP, UKZN, UR	UCT, US, UP, Wits, UR, **UWC, UNW,** UKZN
Middle	UNW, UFS/**UWC**, UJ, NMMU/**UFH**, UNISA	NMMU, UJ, **UFH**, UFS, UNISA
Lower	TUT, UZul, UV, UL, CPUT, CUT/VUT, WSU, MUT	UZul, UV, CUT, TUT, CPUT,DUT, UL, VUT, WSU, MUT

Source: [1] Cooper (2015), [2] HEMIS data for 2014. Notes: (1) The institutions in Column 2 are listed according to level of research intensity from highest to lowest. The institutions in Column 3 are listed in terms of percentage of permanent academic staff with PhDs from highest to lowest.(2) The bold font indicates that the university is performing better than might be expected given its history as a historically disadvantaged institution.

This exceptional performance is also reflected in the analysis of staff with PhDs produced for this article (Column 3 of Table 7). University of Fort Hare is once again in the

middle band and University of the Western Cape in the top band. North West University also has a greater than expected proportion of staff with PhDs. Table 3 shows that all these universities increased their numbers of staff with PhDs to a very great extent – UWC's total of staff with PhDs increased by 67%, NWU by 293% and UFH by 407%. In contrast, University of Limpopo had only 36 more staff with PhDs in 2014 compared with 2005, an increase of 31%. It is significant that although UFH and UWC are both historically black institutions, they were not merged with any other institution. North West University did undergo a merger, but this brought together a relatively low research producing university with one with a relatively high output (Potchefstroom) (Cooper and Subotzky, 2001).

There were other institutions that increased their numbers of staff with PhDs substantially but these were from a very low base – eg. Durban University of Technology had 83 more staff with PhDs in 2014 than in 2005 (an increase of 286%) but this still amounted to only 19% of staff with PhDs.

The alternative classification of universities developed by Cooper and expanded in this article shows that discrepancies between institutions are closely related to institutional history. There are clearly four main factors affecting an institution's performance against these indicators: (1) whether it was originally established as a traditional university or as a technikon; 2) whether the institution was advantaged or disadvantaged under apartheid, which was closely related to the racial group for which it was established; (3) whether it was merged or not post 2004; and if so, (4) with what type of institution it was merged.

With these factors in mind, it is not surprising that the institutions with the highest proportions of staff with PhDs (the upper band) were traditional universities, most had not been merged and most were historically white. It is also not surprising that universities of technology had the lowest proportion of academics with PhDs and formed the bulk of the

lower band, particularly as all but one of them (Mangosuthu UoT) had also undergone mergers. Likewise, most of the historically black universities (UL, UV, WSU and UZ) were in the lowest band, even though they were all traditional universities, while most of the institutions in the middle band were mergers of traditional universities with technikons (UNISA, NMMU, UJ). University of the Free State's location in the middle band, despite it being a historically white, traditional university, is most likely due to its very rapid increase in academically and socio-economically disadvantaged African students. The exceptional performance of University of Fort Hare is most likely due to its high proportion of non-South African academics (see Table 6) while University of the Western Cape was strongly encouraging staff to improve their qualifications long before the national policy drive (personal experience, Breier, who was employed at UWC from 1994 to 2003).

4 Conclusion

South Africa, like many other developing countries, is trying to increase the proportions of academic staff without PhDs. But there are no clear solutions to the conundrum it faces: how to do this when there are insufficient PhD-qualified academics to supervise doctoral students, including those academics who do not yet have a PhD. In 2010, the NDP set a target of 5000 new PhD graduates per year by 2030. We have suggested that this target could be reached if the rate of increase in the period 2005 to 2014 is maintained. However, a great percentage of academics are due to retire within the next decade. This will limit PhD production in general and put the target of 75% academics with PhDs out of reach.

It is also important to ask what these targets will mean for quality. They could lead to pressures to produce PhDs in as short as possible time, with inexperienced supervisors. This might increase PhD production in general as well as numbers and proportions of staff

with PhDs, but it will not benefit the production of knowledge for the country which must surely be the ultimate aim of the PhD.

Solutions need to take account of the differences between institutions that cannot be discerned from the current official classification according to traditional universities, comprehensive universities and universities of technology. This categorization conceals the fact that academic performance, including proportions of staff with PhDs, is generally closely related to institutional history. Four main factors were identified in this article: (1) whether the institutions was originally established as a traditional university or as a technikon; (2) whether the institution was advantaged or disadvantaged under apartheid, which was closely related to the racial group for which it was established; (3) whether it was merged or not post 2004; (4) if so, with what type of institution it was merged.

There are also differences within institutions according to race, gender and nationality which increase the complexity of the situation. There are higher proportions of academics without PhDs among female and black staff. International academics often have higher qualifications than South African academics yet national and institutional equity policies are making it increasingly difficult to make new international appointments, even if the applicants are black.

Disciplines also differ vastly. In some, the PhD is long established and one would be unlikely to get a permanent academic job without one. In others, including many professional and creative disciplines, the PhD is a relatively new phenomenon. There are very few people with the qualification and consequently very few to supervise others. In some professional fields, one might well ask: is it really essential for an academic in this discipline to have a PhD?

Recent international studies focus on the practices and pedagogy of doctoral education (Boud and Lee, 2009; Lee and Danby, 2012) and emphasise the importance of

supervision. Brew and Peseta (2009) argue that supervisors should be developed and supported and suggest a reflexive model of supervision development. Within South African universities, there is an increasing trend towards courses on postgraduate supervision. This often has a dual purpose of supporting academics to be more effective supervisors while also alerting those who are still trying to complete their own masters or doctoral degrees to good supervisory practice. University of Cape Town's Emerging Researcher Programme has been running residential workshops on postgraduate supervision for its academic staff for more than a decade. In most of these workshops 'more than half the participants are simultaneously supervisors and students …engaged with their own PhDs while supervising Masters students' (Holness, 2015). A NUFFIC-funded course on 'Strengthening Doctoral Supervision" developed at Rhodes University was delivered at 18 institutions and has since been reworked to include Masters supervision (Centre for Higher Education Research, Teaching and Learning, 2017).

Whether supervision training is sufficient to make an academic a good supervisor is a moot point. McKenna (2017) argues that supervisors need to be active researchers who are abreast of developments in their field. The question arises: does this necessarily mean the supervisor must themselves have a PhD? While being research active by and large entails having a PhD, and most universities in South Africa require one to have a PhD before supervising at this level, there are some clear exceptions of experts in their field who do not have doctorates and there are instances in which they have been used as co-supervisors.

All these factors suggest that a nuanced, differentiated approach to PhD production and academic staff qualifications is necessary. Such an approach should take account of disciplinary difference and institutional capacity and possibility and recognise that there are some fields, disciplines and institutional contexts in which the PhD might not be absolutely essential. For example, it must be recognised that technikons were legally barred from offering

masters and doctoral programmes before 1993 and have limited capacity to offer postgraduate qualifications as a result. It is not surprising that their PhD production is low and they have relatively few staff with PhDs.

There have to be creative approaches to the lack of supervisory capacity or quality will suffer. These could include the use of PhD qualified staff working for research councils and other research organisations, the use of expert, active, but non Phd-qualified researchers to co-supervise as well as schemes to retain retired scholars who are still active researchers. Joint degrees with international universities are another option.

There should be more opportunities for full time study. The nGAP scheme enables emerging scholars to study nearly full-time for their masters and doctoral degrees, while enjoying the security of a permanent position but the funding available for these posts is clearly not enough to meet the demand.

Finally, the PhD should not be seen as an end in itself. It is not just a question of being able to boast that we have high proportion of staff with PhDs. The PhD must have value. Its purpose is to enable the country to function in a global knowledge economy, to produce high quality knowledge. If this is not borne in mind the qualification will be devalued, its contribution to society minimised and recipients will soon realise that they have been chasing after useless pieces of paper!

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