



SARUA LEADERSHIP DIALOGUE SERIES VOLUME 4 NUMBER 1 2012

DOCTORAL EDUCATION

Renewing the Academy

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SARUA is a not-for-profit leadership association of the heads of the public universities in the 15 countries of the SADC region. Its mission is to promote, strengthen and increase higher education, research and innovation through expanded inter-institutional collaboration and capacity-building initiatives throughout the region. It promotes universities as major contributors towards building knowledge economies, national and regional socio-economic and cultural development, and for the eradication of poverty.

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ACRONYMS

ASSAF	Academy of Science of South Africa
CESM	classification of educational subject matter
CHE	Council on Higher Education
CODESRIA	Council for the Development of Social Science Research in Africa
CODOC	Cooperation on Doctoral Education between Africa, Asia, Latin America and Europe
DHET	Department of Higher Education and Training
DRC	Democratic Republic of Congo
DST	Department of Science and Technology
ESS	effective subsidy students
EUA-CDE	European University Association Council for Doctoral Education
FFC	Financial and Fiscal Commission
FTE	full-time equivalent
GDP	gross domestic product
GER	gross enrolment rate
HEMIS	Higher Education Management Information System
HEQF	higher education qualifications framework
HESA	Higher Education South Africa
IAU	International Association of Universities
ISSOTL	International Society for the Scholarship of Teaching and Learning
LSS	lecture and seminar series
MIS	management information system
MRC	Medical Research Foundation
NFF	new funding framework
NQF	National Qualifications Framework
NRF	National Research Foundation
NSFAS	National Student Financial Aid Scheme
OECD	Organisation for Economic Co-operation and Development
PANGeA	Partnership for Africa's Next Generation of Academics
PhD	doctor of philosophy

ACRONYMS

PHEA	Private Higher Education in Africa
PQM	programme and qualification mix
R&D	research and development
SADC	Southern African Development Community
SAPSE	South African Post-secondary Education Information System
SARCHi	South African Research Chairs initiative
SARUA	Southern African Regional Universities Association
SDF	Skills Development Fund
SET	science, engineering and technology
UDSM	University of Dar es Salaam
UNESCO	UN Educational Scientific and Cultural Organisation



INTRODUCTION: STRENGTHENING HIGHER EDUCATION CAPACITY AND DOCTORAL EDUCATION IN SOUTHERN AFRICA

Piyushi Kotecha
Chief Executive Officer, SARUA

SARUA'S revitalisation of higher education in Southern Africa should receive various regional governments' support, as the higher education sector, across the SADC region, should be in the forefront in promoting regional co-operation and partnerships between and amongst universities, with particular reference to the need for growth in quality doctoral education throughout the region. For us to dismantle colonial walls and to assist our citizens to be conscious of the need to decolonise their minds, to enlighten so to say, we should unreservedly make huge investments in developing the kind of intellectuals who will steer the agenda for change wherever they are.

— *Hlengiwe Mkhize, Deputy Minister of Higher Education and Training*¹

Southern Africa has a burgeoning youth population that requires access to tertiary education. A quarter of Africa's population - 276 million people - resides in the SADC region, and half of this population is between the ages of 15 and 29. The youthful nature of the region's population, high fertility rates and the policy focus by governments on education (especially primary schools) indicates that the demand for tertiary education is likely to remain high.

Increasing access to quality higher education in Southern Africa requires appropriate policy, and national and institutional strategies. While some of this reform must be driven by national governments, much will ultimately rest on the leadership provided by key higher education role-players who have to contend with two imperatives:

- First, the higher education system needs to expand massively, both at entry level as well as at postgraduate level. However, this is occurring in the context of a global recession and scarce resources, in which public funds are already committed to other urgent priorities (e.g. basic education, health).
- Second, transforming the higher education sector is as important as expanding it. This will involve a paradigm shift in the quality and focus of learning, teaching and research, and a shift away from single-discipline scholarship towards inter-disciplinary and transdisciplinary collaboration.

¹ Speech delivered to the SARUA Gala Dinner, Sunnyside Park Hotel, Parktown, Johannesburg, 15 March 2012.

As public and private institutions struggle to meet the demand for higher education, serious questions have been raised about quality. Increased enrolment figures are not matched by increased graduation figures, particularly at postgraduate level.

In March 2012, the Southern African Regional Universities Association (SARUA) held a two-part dialogue at the University of Johannesburg on the critical subject of building the capacity of higher education to enhance regional development in Southern Africa. Vice-chancellors and thought-leaders from 15 countries throughout the region attended the first part of the dialogue entitled 'Growing the Academy: Forging strategies for quality teaching and scholarship in Southern African universities'. The university leaders discussed policy and funding issues, explored the role of academics, identified the skills and knowledge needed for improving both teaching and research, and examined key areas for urgent intervention. This discussion touched on many issues, including:

- the main challenges facing Southern African universities in building their capacity;
- forging institutional initiatives and policy to develop and retain academic talent;
- introducing appropriate support programmes for new academics; and
- devising funding mechanisms for the region's higher education, so that universities can play their role in supporting integrated development.


The second part of the dialogue was held in partnership with the Co-operation in Doctoral Education (CODOC) Project² and was attended by Southern African university vice-chancellors and experts in doctoral education from around the world. Entitled 'Doctoral education, leadership and knowledge societies: Redefining global relationships', the workshop stressed the importance of increasing the number of doctoral students as a key component of growth in the region, and provided an opportunity for participants to reflect on strategies for strengthening doctoral education in Southern Africa, informed by international experience. A report on the CODOC workshop has been published separately on the SARUA website (www.sarua.org).

The urgent need for growth in doctoral graduates has been well articulated, and universities are investing in addressing the overall shortage of doctoral graduates amongst the ranks of academics. Increasing the pool of academics with doctoral qualifications is essential to ensure the next generation of academic staff. However, doctoral enrolments remain only 1 per cent of total university enrolments in the region and 0.17 per cent of enrolments if South Africa is excluded.

The absence of funding for doctoral education has been identified as one of the critical factors that contribute to the low number of doctoral graduates in universities in Southern Africa. In addition, universities face other challenges that impact on doctoral education. One of these is that universities are being compelled to reposition themselves in order to accommodate increased internationalisation, the globalisation of markets and the growth of Internet technologies. Apart from the challenge of producing new doctoral graduates, it is difficult for Southern African universities to retain these graduates, especially in certain key disciplines.

Strategies for the expansion and transformation of higher education include improved cross-border collaboration to share human resources and expertise. Strategies also involve scaling up and modernising the Internet infrastructure, establishing information management systems that are compatible across national and linguistic boundaries, and developing nodes and networks of expertise and specialisation throughout the region.

² For details on the CODOC Project see <http://www.codoc-project.eu/>.



The question is how to make quality education (and particularly postgraduate education) more accessible, so that higher education institutions can build knowledge economies nationally and regionally, to successfully address the development needs of the Southern African region.

While this report cannot capture the detail of each discussion, it provides an overview of the main features of the three-day dialogue. Together, these contributions outline the urgent need to strengthen higher education institutions in Southern Africa, describe the international context in which universities currently find themselves, outline regional trends in higher education, and suggest strategies that can be adopted to improve the quality of and access to higher education – and doctoral education in particular.



RENEWING THE ACADEMY: CHALLENGES FACING SOUTHERN AFRICAN UNIVERSITIES

Rwekaza S Mukandala

The origins of the institution that we now call ‘the university’ can be traced back to the ancient times of Socrates, Plato and others. These famous scholars provided to large groups of people what was acknowledged as learning of the highest order. At this time, the pursuit of higher learning was a personal matter between teacher and student, and no formal institutions existed. This kind of higher learning also existed in parts of Africa, as exemplified by the work of the Tunisian scholar Ibn Khaldoun, who in the 14th century attracted large numbers of students at his court. This is to say that, universities in their constantly changing form have existed in Africa as long as in other parts of the world.

Over time, universities (initially in France and Italy) took a more visible form. This came about as groups of teachers and students spontaneously came together and established autonomous corporations that were granted royal charters to pursue higher learning and teaching in their respective cities. In Africa, this phase of higher education development materialised in parts of Morocco, Egypt and the city of Timbuktu (in present day Mali).

In their current form, university institutions first emerged in Africa in the 19th and 20th centuries, with the coming of European influence and the subsequent colonisation of the continent by European powers. It was during this period that elitist and meritocratic colleges were established, such as Forah Bay College in Sierra Leone (1827), the University of Cape Town (initially the South Africa College, 1829), and the University of South Africa (1873).

In due course, these colleges were joined by similar institutions established in the immediate post-Second World War period, to cater for colonial white labour needs. Examples of this second generation of modern African university institutions include the University College, Ibadan (1948), Makerere University College (1949), the University College of Rhodesia and Nyasaland (1955), the University College, Dar es Salaam (1960) and many others. Although these colleges first started as affiliates of established metropolitan universities, during the 1970s and 1980s they gradually expanded and consolidated themselves as centres of higher learning in the newly emerging nations.

From the late 1980s onwards, university education in most African countries suffered a major setback, as governments, following World Bank and IMF pressure, neglected higher education in favour of basic education. This neglect resulted in the serious decay of established infrastructure

and in a general weakening of higher education systems on the continent. In recent years, however, there have been renewed efforts to expand and advance higher education in virtually all African countries. This revival is seen in new initiatives to revitalise the sector, which are being taken by countries and by individual universities, with support from donor organisations and the international community. However, in almost every university and in every African country, these renewal efforts are encountering serious challenges and setbacks; and it is this situation that defines the context for our discussion.

The current context for the development of Southern African universities

Before we identify the main challenges facing the academy in our region today, it is imperative to understand the unusual circumstances under which universities in Southern Africa (and elsewhere on the continent) are currently operating, as they try to sustain and improve their effectiveness and relevance. The elements that define our current context are many and mostly interlocking, but they include:

- heightened demand for university education, which necessitates rapid expansion of student enrolment;
- a proliferation of new universities, which promises to increase enrolment and reduce the demand pressure, but which at the same time threatens to damage quality as already scarce resources are spread too thinly. These new university institutions are often established by upgrading technical high schools and vocational training centres, which undermines not only the systematic growth of higher education in the respective countries, but also the balance between research-based higher education on the one hand and vocational training on the other; and
- growing shortages of qualified and experienced academic staff in higher learning institutions, which makes it difficult to sustain quality university education even in established institutions.

These features of the higher education system are in turn part of a broader socio-political context in the region, which includes:

- economic underperformance in most countries, and the consequent difficulty in obtaining adequate funding for higher learning institutions (public and private);
- strengthening of competitive multi-party politics which, while promising a more democratic society, has tended to divert attention from the most basic issues in society, making it difficult to handle such urgent issues as the high and increasing demand for higher education;
- ongoing global economic crisis and its repercussions on the availability of donor support for African universities; and
- advancing global quality benchmarks for universities, and the difficulty for African universities to cope.

Some of the issues mentioned as elements in the context of higher education development in Southern Africa are themselves substantive challenges for universities.

Overview of higher education challenges in Southern Africa

The current socio-economic and political context in our region imposes numerous challenges on universities and on the higher education sector in general. The list of challenges is infinitely long, but this paper will focus on a few of the most basic ones.

Heightened demand for university education

During the last two decades, the demand for university education has risen sharply in Southern Africa, as demonstrated by swelling numbers of admission applications. Despite minor variations, the trend has been characteristic of higher education in the region and in most other parts of the continent. University admissions have expanded rapidly, with an annual continental average of 16 per cent between 1999 and 2006, and it has been reported that in some of the poorer African countries the number of students attending higher education institutions quadrupled between 1991 and 2006 (World Bank 2010). At the University of Dar es Salaam, student enrolment expanded from just over 3 000 in the early 1980s to 8 439 in 2002/2003, and more recently from 14 637 in 2006/2007 to 16 064 in 2009/2010 (UDSM 2008). Recent projections have shown that in 2015 Africa will have twice the number of students in higher learning institutions as it had in 2006 (World Bank 2010).

While the increasing demand for university education is a welcome trend given the potential role of higher education in stimulating development, it imposes upon the academy a multitude of difficult demands. It calls for necessary expansions in the physical infrastructure, including classrooms, laboratories, workshops and student accommodation. More importantly, it demands sharp increases in resource inputs into the academy, especially in terms of staff recruitment, training and retention; acquisition of learning and teaching materials; and maintenance of sound university-industry linkages to ensure absorption of the increasing numbers of graduates into meaningful occupations. The real challenge for university leaders and stakeholders is how to attend to all these increasing demands in the current context of resilient underfunding of public higher education institutions, increasing shortages of academic staff and uncertainties about donor support. Due to poor economic growth in most countries of our region, this challenge equally concerns private universities. The thrust of the challenge is about how to match the advantages of expanded enrolments with the need to uphold quality standards.

Governments and universities in the region have made attempts at addressing this challenge, with varying results. The surging numbers of students seeking university admissions have encouraged private investors and social service providers in the region to establish new private universities. At the same time, the need to expand overall enrolment in higher education has made most governments in the region more supportive of the establishment of private universities, at times offering loans or bursaries to students who are enrolled in private universities. As a result, we have witnessed rapid increases in the number of private universities in most countries of the region. According to one source, by 2003 Sub-Saharan Africa already had 100 private universities, of which 65 were established between 1991 and 1999. In South Africa, for instance, the number of private universities rapidly increased after the political reforms of the 1990s, reaching a total of 92 by 2007 (University World News 2008). A similar trend has been observed in other countries of the Southern African region, including Tanzania, where proliferation of private universities started in the early 2000s, reaching a total of 20 by the end of 2011.

These increases in the number of private universities have the potential to reduce the pressure of admissions on public universities by taking away a considerable proportion of the annual applicants. However, private higher learning institutions have already demonstrated characteristics that minimise their contribution to alleviating pressure on public universities. They have generally tended to admit only small numbers of students, while offering a limited range of study programmes. In addition, they have characteristically avoided investment in strategically valuable study programmes, preferring instead to focus on courses that are cheap, popular and lucrative from the point of view of the current job market (such as business administration, management, media, computing and education). Clearly missing in the agenda of these new private universities

is the core higher education mission component of research and advancement of science and its application. Although the number of private universities currently surpasses that of public universities in many Southern African countries, their contribution to the efforts to address the challenges facing the academy is thus minimal and hardly promising for the future.

The need to sustain appropriate staffing levels and standards

One implication of the increasing demand for university education is the need for additional staff in keeping with the expanded intake. This is already widely acknowledged as a challenge that needs special attention. A recent continent-wide study concluded emphatically that:

Over the last decade student enrolment in African universities has grown by significant amounts in response to the increasing demand for higher education. While expanding access to the underserved but eligible population is commendable, the pressure of enrolment growth on the capacity of universities to provide quality education is a serious problem, **especially as it has not been met by an adequate expansion in academic staff** [emphasis added].

The problem manifests itself in the form of rapidly rising staff–student ratios in many universities, resulting in enormous pressure on the available academic staff, and often making it almost impossible for them to do anything other than teaching. The situation is worse in some countries following governments' freezing of new recruitment under the structural adjustment programmes of the 1980s and 1990s. Although from the early 2000s universities have resumed regular staff recruitment, this has created the additional problem of badly skewed age profiles of university staff. The majority of staff members are either at the lowest level of tutorial assistants and assistant lecturers, or at the highest level of professors and associate professors. The situation is exacerbated by poor capacity of most universities in the region to offer postgraduate training to their junior staff, or to facilitate their training elsewhere.

Together, the two problems of general staff shortage and the skewed age distribution put in jeopardy the very foundations and basic reproductive capacity of universities in the Southern African region, let alone the quality of their scholarly outputs. The situation calls for concerted efforts in capacity-building, especially in the area of staff training and retention. How to obtain the necessary resources for the achievement of these objectives is a challenge that requires innovativeness and increased collaboration between universities, governments, the private sector and the donor community. It is a challenge that calls for a combination of emergency interventions and long-term strategic measures.

The imperative to maintain adequate research outputs and dissemination

Shortages of qualified staff in the context of expanding student intake and resilient budgetary deficits necessarily result in the erosion of universities' capacity to carry out meaningful and productive research. This is not merely a logical derivative but an acknowledged reality in many Southern African universities today. Indeed, as noted in a continent-based report:

In most African countries, conditions for research have been severely compromised as manifest by the generally poor remuneration, heavy teaching loads, inability to mentor young faculty, and inadequate infrastructure (Sawyer 2004).

As research and knowledge creation are defining characteristics of a 'university', absence or severe diminution of this aspect in a higher learning institution spells an imminent loss of its university

status, and this is the situation in many universities of our region. How to change this situation is one of the greatest challenges of our time, and must begin by addressing the two basic and mutually constitutive conditions that have given rise to it: acute shortages of qualified university staff, and resilient underfunding of higher education.

The challenge of balancing the norms of an ideal academy and the appeal of market-driven initiatives

Time and again, and especially since the late 1980s, universities in Southern Africa (and around the world) have found themselves in a dilemma. On the one hand, university leaders know that the key role of their institutions in society is to provide leadership in knowledge creation, dissemination and application in advancing human well-being and prosperity. We are also all aware of the fact that for an institution to merit the name 'university' it ought to adhere to certain basic and universal principles, which include commitment to truth-seeking, devotion to the expansion of knowledge horizons, curriculum diversity and concern with human and world affairs in the long term. On the other hand, however, universities have been under pressure to constantly adjust their curricula and delivery methods so as to attract funds and students in order to ensure their economic viability.

The challenge that comes with this situation is that the options available to us in seeking 'currency' and 'relevance' in the short term often do not coincide with the universal and timeless principles that define a university. Worse still, seeking currency and relevance at the present conjuncture has often meant neglect of the basic study fields in the sciences and humanities in favour of easily marketable, skills-orientated and often tailor-made programmes. What does this mean for the future of the academy? I think it spells disaster. We may gain some comfort when short-term strategies yield satisfactory results (in terms of financial resources and student numbers), but unless efforts are simultaneously made to ensure the survival of the basic disciplines and study programmes, well-established universities are bound to degenerate into second-rate and inexperienced polytechnics. At that point the issue of poor research capacity would not even arise and, to that extent, the institutions concerned would have lost the most elementary attributes of what it takes to be a university.

Balancing the norms of an ideal academy with the imperative to be responsive to changing market demands presents a mammoth challenge to universities in this region and in other parts of Africa. The question that we must continue to pursue is 'What should universities and their stakeholders do to renew the academy without losing sight of its essential characteristics and mission?'

How to respond to non-traditional demands on the academy

Apart from issues relating to the basic requirements for the survival and sustained relevance of the academy as it is commonly known to us, some of the challenges that currently face universities have implications that go beyond the conventional nature and role of the academy. The rise of non-conventional demands on the academy presents new challenges.

The traditional mandate and social responsibility of universities is to provide leadership in knowledge creation, dissemination and application in improving humanity's well-being. While these precepts still apply, society now looks upon the academy with new expectations and demands. New thinking about development in Africa (and the developing world in general) has recently adopted the concept of a 'learning society' and the related notion of 'knowledge-intensive' approaches to development. With time these ideas have been transformed into new demands or expectations of higher learning institutions.

African universities are therefore being challenged to do new things, and to do them in a more sophisticated manner. They are called upon not only to be centres for the creation of new ideas for sustainable development, but also to work more intensively towards developing or adapting knowledge to local situations. In addition, universities in Africa (as elsewhere) are expected to spearhead technological innovations and information transfer, which are seen to be critical for economic growth and social progress.

Obiageli Ezekwesili, the current World Bank vice-president for Africa, has argued that in order to play their part in the new context, universities in Africa need to 'leverage [their] collective strengths across national boundaries and build linkages with existing pools of world-class knowledge' (Kokutsi 2011). It is obvious that the road to success is long and twisted, and that much more innovative thinking is needed to make our universities responsive to new societal demands.

Coping with advancing global benchmarks for university institutions

Another challenge that has implications going far beyond the nature of the academy in its conventional form is the rapidly advancing global quality standards for universities. Universities in the developed world are becoming more and more sophisticated in terms of the quality standards they are adopting. In addition to the conventional standards (such as entry qualifications for students and staff, together with basic operational modes), universities are increasingly upgrading their benchmarks to include features such as availability of adequate research funds, number and value of competitive grants won annually, proportion of international and fee-paying students, capacity for delivery of distance education, and flexibility of study programmes to individual students' interests and study planning.

These developments are indeed expected and welcome, as they promise greater efficiency and productivity in the performance of higher education as an enterprise. Universities around the world have no choice but to make efforts to cope with the changing standards. Yet the rapid advancements in the global benchmarks for what may be considered to merit university status pose a major challenge to resource-constrained universities. Because they are unable to immediately set and adhere to emerging global standards, they risk losing (or failing to get) international recognition, which would make it difficult or impossible to access mutually-enriching opportunities for international collaboration (e.g. in the form of student and staff exchange and research partnerships). The obvious result of this would be the isolation of many resource-constrained universities, and their further decline in productivity and status.

Universities in Southern Africa face the very real danger of being left far behind. It will require innovativeness and relentless effort on the part of university leaders and stakeholders to meet this challenge.

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RENEWING AND GROWING THE ACADEMY: REDEFINING GLOBAL RELATIONSHIPS

Jimi O Adesina

Nearly three decades ago, at the 1986 meeting of African vice-chancellors in Harare, the World Bank argued that as a continent Africa was wasting scarce resources investing in universities; the returns were simply not Pareto-optimal, and Africa was better off sending its prospective graduates overseas for their university education. To their credit, the vice-chancellors rejected this suggestion out of hand, but this did not stop the massive retrenchment of public investment in the following two decades. The impact was a reversal of two earlier decades of building the higher education system in post-colonial Africa, not only in the area of pay but also basic resources for research and teaching. The exodus of leading scholars and researchers and the difficulty of retaining bright young scholars within the system broke the inter-generational conveyor belt that is so vital for the sustenance of institutional memory and scholarship. Some aspects of the effects of the social experiments that followed have been captured in vivid detail by Mahmood Mamdani in *Scholars in the Marketplace* (2007).

The Bank, of course, went on to discover something called the knowledge economy, and that higher cognitive skill and competencies are vital for such an economy – skills that we are told make university education essential for global competitiveness in the 21st century.

The challenge of reconstruction and renewal of the African higher education system is a central challenge. Restocking the existing public universities with well-trained and competent doctoral degree holders is central to this task. If a university is a place where we train people to answer in twenty years' time questions that we cannot even formulate today, then the combination of high cognitive skills and research competencies is vital for those charged with training even the first-year intakes. Rather than a qualification whose attraction is the title that it bestows on the holder, or something to earn near the end of one's academic career, the process involved in earning a doctoral qualification is a unique training ground for the skills that are vital to an academic career. But, even in the relatively better-endowed higher education systems such as South Africa or Botswana – which might not have suffered the effects of the neoliberal policy climate since the 1980s – the low graduation rate of doctoral candidates remains a major challenge. The consensus study report of the Academy of Science of South Africa (2010) shows a dramatic shortfall in PhD requirements for the country by 2018. The report claims that the annual PhD production rate in South Africa is between '23 and 27 PhDs per million of the population per annum' yet the projected requirement of the country by 2018 is 6 000 PhDs, half of which are expected to be in the fields of science, engineering, and technology (ASSAF 2010: 21).

Such a shortfall requires a dramatic increase in graduation rate, not simply to meet the projected need but also to replace an ageing professoriate. As the authors of the report noted 'this ambition to escalate the number of well-trained PhDs in South Africa raises fundamental questions about national capacity, critical partners, innovative programmes, strategic investments and cross-sectoral co-operation' (ASSAF 2010: 21). One could add global exchange and the development of regional nodes to the options available for addressing the challenge.

Renewal and growth: making sense of global relationship

The concern with building global relationships as part of the portfolio of tools for renewing and growing the academy raises issues similar to those of *internationalisation* in education research and policy, and *cosmopolitanism* in the wider sociological (or social science) discourse. The historical accounting for internationalisation suggests three important phases. First is a period of high mobility of students and staff between learning centres. This process lasted up to the 18th century, only to be replaced by the growth of a 'predominantly nationally orientated higher education' (Knight & De Wit 1995: 8). While there was propagation of the models of higher education of the metropolitan centres in their settler-colonial territories, the institutions were encased in the 'container boxes of nation-states' in Ulrich Beck's (2000a, 2000b, 2001) formulation of the cosmopolitanism discourse. The third phase, generally associated with the post-Second World War period has seen the opening up and shift towards a transnational re-convergence (or greater internationalisation), away from the divergence created in the second phase (Knight & De Wit 1995, Yang 2002).

First, what is obvious from this narrative is that it takes a distinctly European experience as the basis for constructing a discourse of internationalisation, which may diverge from the experiences of other parts of the world. Second, is that the discourse of internationalism mirrors that of cosmopolitanism. At a recent university forum, a senior official presented the report of a recent visit to Europe. He expressed the options facing the university as clear and stark: internationalise or don't internationalise. Such binary argument mirrors another, the contrasting of 'cosmopolitan outlook' sensibilities and values with what is assumed to be its conceptual anti-thesis, 'local outlook' sensibilities and values (Roudometof 2005: 121).

Scholarship by its nature is both international and local. From China to Timbuktu, scholarship and mobility have from human antiquity been synonymous. The transmission of ideas, the itinerant scholar and student, or those who cross from one place of learning to another have always been strongly related. Roudometof's ideas of 'transnational social spaces' and 'transnational social fields' are of some relevance here (2005: 119-120). Transnational social spaces would refer to trans-territorial 'spaces of human interaction' enabled by what he called 'internal globalisation' (i.e. 'the process of creating the room or space for these interactions'). Transnational social fields on the other hand may involve people interacting transterritorially but without having to leave their territorial spaces (ibid.: 120). Both processes, we would argue, have always been inherent in the nature and functioning of universities and scholarly communities across time and space.

Roudometof's formulation might be of some help, but only so far; it allows him to transcend the binary reasoning in early cosmopolitan discourse by constructing cosmopolitanism and localism at two ends of a continuum. The problem is that a continuum is not the same as two things existing in mutual embeddedness. We cannot talk of a coin without the head being understood as immediately embedded with the tail.

Nor will the idea of 'glocalisation' or, worse still, 'glocalised cosmopolitanism' (Tomlinson 1999) do. As with internationalism, in the field of cosmopolitanism writers have made a habit of spurning the new and bewildering collage of phrases. The fewer of these the better for analysis and comprehension of what is really at stake.

An understanding of the universal and the particular (the global and the local) as two mutually embedded categories, rather than as binary opposites or ends of a continuum, may help in making sense of the nature of 'global exchange' and what 'internationalism' means.

Internationalisation as one-sided adaptation

The idea of 'global exchange' in the sphere of intellectual relations and graduate training raises the question of what is being exchanged. As Rui Yang noted, in their 'opening out' Chinese higher education institutions were challenged to connect their 'educational practices with the mainstream of international trends' (2002: 84). This has generated immense controversy within the Chinese higher education system regarding the problem of 'one-sided adaptation' and 'the neglect of national characteristics' (ibid.: 84). Interestingly, in a 1994 national symposium, it was not a sociologist or ethnologist who raised the matter, but the president of the Nanjing University of Aeronautics and Astronautics (ibid.: 84). Yang noted that his 'interviews with Chinese scholars yielded an impressive mix of zeal for internationalisation, together with confidence in their own culture' (ibid.:91). Indeed, 'the confidence expressed by Chinese scholars in their traditional culture cements their acceptance of international standards' largely because it was possible to meet the challenges with a firm confidence in their situatedness. While universities may be 'major custodians of the best that has been thought and said' (ibid.: 87), scholarly exchanges and interactions are not innocent.

Internationalisation or global exchange does not immediately suggest the presence of the norms of 'solidarity among strangers,' mutual respect or norms of reciprocity, much less a commitment to global justice. As with economic relations, academic exchange may be grounded in and driven by what Dos Santos (2003) called 'unequal global distribution of resources.' Transnational social spaces may produce human agents who think globally, but they are not devoid of power relations (or who may be holding the begging bowl).

As most scholars in the field of internationalism have argued, motivations for internationalisation and exchange are diverse. These range from a commitment to global solidarity to the use of intellectual exchange resources for national geo-politics and security objectives.

The nature of exchange relations

This brings us back to the question of the nature of global exchange. While the narrative of internationalism in the global North has constructed a shift from convergent cosmopolitanism to divergent nation-state mindedness (and parochialism), and the post-Second World War turn to internationalisation and convergence, the experience of modern higher education in our context is hardly anything like this - and this affects how we think about global exchange.

For many African universities, almost everywhere a transplantation of North Atlantic metropolitan models, we did not emerge from the localism of Ulrich Beck's (2000a, 2000b) nation-state boxes to embrace a cosmopolitan nirvana or to be internationalised. Our curricula, staffing and institutional cultures were European transplants with a strong dose of what the Beninois philosopher Paulin

Hountondji referred to as 'extraversion.' If there is one thing that most of our institutions and modes of knowledge production lacks, it is the 'national character.' Every key area of research, from the so-called African Studies to Anthropology, Sociology, Politics, Medicine and Space research was shaped in the image of the North Atlantic metropolis.

Even in the social sciences, where local rootedness or national character is easily formed and seen in the North Atlantic scholarship, this is hardly the case in most of our universities and scholarship. The result of extraversion is curricula that are disconnected from the collective memories that our students bring to the university, which is interpreted by many of them as alienating. In the teachers themselves, what is apparent is a crisis of 'status anxiety' and status ambiguity relative to Northern theories.

To engage in global exchange, one has to have something of value to trade. In the atmosphere of abstracted cosmopolitanism, it is useful to remind ourselves that, as Mafeje (2000: 66) warned, 'the fashionable floating signifier is an illusion ... To evolve lasting meaning we must be rooted in something.'¹ Meaningful exchange in scholarship requires something of distinct epistemic significance. The effect of epistemic dependence is that the value of the subordinate in such relations of exchange is largely as a hewer of data or native informant, rather than as a co-producer of theories or knowledge in its epistemic sense.

What is to be done?

A starting point is that the same institutional attention that is paid to building and staffing international offices needs to be paid to overcoming the crisis of extraversion in our scholarship and curricula. It starts with researchers who take their locales seriously as the premise of scholarship, in a distinctly epistemic sense, and this stretches from Sociology to Chemistry and Astronomy. The same situatedness that Yang reported among Chinese scholars is feasible for those who show little anxiety about casting 'localism' and 'cosmopolitanism' as binary opposites. Such ventures must proceed in tandem with a genuine internationalisation – one that is truly global rather than a re-enactment of imperial relations. Within SARUA, transnational exchange needs to be as much about students from Wits going to Lubumbashi as it is the other way around. Similarly, we should place as much value on South-South exchanges as we currently place on North-South ones.

The danger of creating new poles of one-way flow of staff and students within the SADC region should be obvious. As with backwash effects in regional economic integration, the same backwash effects arise in intellectual exchange and mobility. This requires a rethink of the use of the limited resources available. It requires pooling resources and the use of nodal centres for doctoral training. The embryonic Pan-African University provides a platform and a model, with relative equitable distribution of doctoral training centres or summer institutes. Such regional nodes can be points of work relationship with global partners.

It is, of course, impossible to see the challenges of the higher education sector and doctoral training in isolation from the wider (and nationally-specific) challenges. Throughput to higher degrees is a function of motivation and performance at lower levels. Capacity to retain doctoral

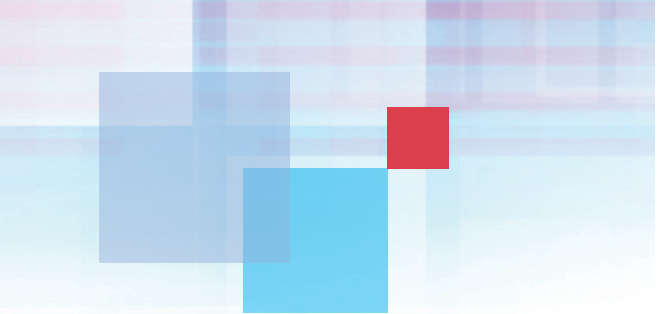
¹ 'First nobody can think and act outside historically determined circumstances and still hope to be a social signifier of any kind. In other words, while we are free to choose the role in which we cast ourselves as active agents of history, we do not put on the agenda the social issues to which we respond ... [W]e would not talk of freedom if there was no prior condition in which this was denied; we would not be anti-racists if we had not been its victims ... Secondly, unlike the illusory 'free floating signifier,' it is the historical juncture which defines us socially and intellectually' (Mafeje 2000: 66).

candidates after graduation (or their return home) may have to do with broader economic and livelihood climates in a particular country. Nonetheless, those with responsibility for the higher education sector cannot wait until all the other issues are fixed before they strive to turn adversity into benefits.

Let me end by dedicating this address to the memory of my mother who passed away two days ago. She was for much of her life a teacher – in and out of the classroom. Much of the sense of the pastoral essence of being a university teacher and never giving up on any student, I learnt from her.

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THE STATUS QUO OF DOCTORAL EDUCATION IN THE SADC REGION

Piyushi Kotecha, AGW Steyn and PJ Vermeulen

Like higher education institutions in many parts of the world, Southern African public universities face the problem of ageing academics, while struggling to attract young people in significant numbers into the profession. Compounding factors include skills shortages and competition for skills with private and public sectors, an ongoing brain drain, failure to produce suitably qualified academics, poor conditions of service and low salaries (which often cause academics to seek additional sources of income, diverting their efforts away from academic pursuit), and low numbers of suitable supervisors and mentors.

Given the increasing recognition of the importance of universities in developing graduate citizens who can participate in the economic and social development of knowledge economies, the challenge is to develop the human resources necessary to meet the demands of higher education. The growth in doctoral graduates required to fulfil the needs of higher education is well articulated, and universities are investing in addressing the overall shortage of doctoral graduates amongst the ranks of academics.

However, SARUA's latest research has shown that doctoral enrolments are only 1 per cent of total university enrolments in the SADC region, and only 0.17 per cent if South Africa is excluded. South Africa is the country in the region with the highest number of doctoral students and graduates, many of whom originate from other SADC countries.

Two recent research study reports illustrate the new focus on doctoral education that is emerging in Africa. The International Association of Universities (IAU) report, *The Changing Nature of Doctoral Studies and Doctoral Study Programmes in Sub-Saharan Africa* (2010) and the Academy of Science of South Africa (ASSAF) PhD Study (2010) adopt very different perspectives, and it is interesting to compare the basic intentions of these two important studies.

The IAU report describes the status, challenges and opportunities for reform in the field of doctoral studies. The motivation for the research is clearly stated: universities are experiencing 'fundamental changes in the way they perform their core functions linked to knowledge creation'. These changes include 'changes in the world order as a result of increased internationalisation, the development of knowledge societies, (and) the globalisation of markets due to the growth of internet technologies'. Such changes have forced Sub-Saharan African universities to reposition themselves in order to fit in with global trends.

The ASSAF report, dealing with the situation in South Africa specifically, has a more inward-looking approach, dealing with the practical question of 'how to meet the demands for high-level skills in an emerging economy' (ASSAF 2010: 15, 21). Through the collation of a variety of quantitative and qualitative data, it has been possible to provide 'an account of the status of the PhD in South Africa' (ASSAF 2010: 15, 21), and to set out specific recommendations for what needs to be done to scale up the number of doctoral graduates produced in that country.

Both research focuses – the concern with external realities in the one, and the concern with internal demand in the other – combine to speak directly to the role of universities in national and regional socio-economic development. Both research studies provide important pictures of the status quo with regard to PhD studies in the geographic areas under scrutiny. When these pictures are combined with basic statistics collected by SARUA in 2008 (SARUA 2008a), a useful framework is established for doctoral programmes and their performance on the continent as a whole.

The following definitions (based on those used in the IAU report) are important to achieve some uniformity in the way people think of doctoral studies:

- The term 'doctoral studies' means independent research or a combination of independent research and course-work at a doctoral level, which leads to the awarding of a PhD degree.
- The term 'doctoral study programme' means an in-depth course of study designed to strengthen independent, critical and analytical skill, and must result in an original contribution to the specific field of study that should be of publishable standard.
- The term 'doctoral student' refers to full- or part-time students engaged in doctoral studies, either through fully research-orientated activities or via a combination of research and course-work.

Of themselves, these basic definitions do little to address the question of the maintenance of PhD standards across disciplines, institutions, countries and regions. The IAU Sub-Saharan study, which examines in detail the doctoral programmes of six universities in West and East Africa, reports on considerable differences in approach and quality of doctoral programmes. However, the spread of the knowledge economy around the world is transforming doctoral education from a national to a global system, a reality that will inevitably involve common standards. In the ASSAF PhD study, a useful quote appears: 'We need to educate doctoral students who are world citizens, who cross national boundaries without seeking to assimilate and homogenise but instead accept differences and embrace diversity' (ASSAF 2010: 37).

Do the number of doctoral degrees being produced and the disciplines in which they are produced become useful indicators of higher education's value as an agent of development? The answer is in the affirmative, because economic theories relating to the knowledge economy argue that knowledge is crucial to national economic growth:

Theories of the knowledge economy locate the causes of economic growth in novel ideas leading to scientific, technical, organisational, environmental or health innovations. Natural resources are no longer the key factors in economic growth (ASSAF 2010: 36).

It is innovation and technical change that results in growth and international competitiveness.

As a core function of universities, doctoral research provides invaluable education and training aimed at producing highly skilled knowledge workers capable of transferring their intellectual and technical expertise to wide-ranging global contexts. The PhD [...]

is particularly acknowledged as a generator of knowledge and skills in key strategic areas of national innovation systems, (and) a contributor to industrial and social resources (ASSAF 2010: 35).

It can reasonably be argued that, given approximate uniformity in the quality of doctoral activity at universities, an examination of the quantity of such activity can be used as an indicator of the effectiveness of higher education in national and regional development.

Doctoral enrolments and graduates

In the 2010 ASSAF PhD study, the South African situation is analysed in great detail, and it is usefully placed in an international league table where it is compared with the performance of other countries, both developed and developing. In another recent study (Steyn 2011), the teaching output (degrees, diplomas and certificates) for the period 1997–2009 is analysed according to major field of study and type of qualification. Using these two studies, HEMIS information and SARUA's baseline research (SARUA 2008a), a picture is presented of the situation in the SADC region where comparisons can be made between the performance of South Africa's public universities and those in other SADC countries. The IAU Sub-Saharan study provides a broader African perspective.

The SADC region

The SADC region, which includes a dozen mainland countries plus the islands of Madagascar¹, Mauritius and Seychelles, comprises approximately 250 million people spread unevenly across 15 states. Equally uneven is the spread of public (state-funded) universities. When SARUA undertook its baseline study of SADC higher education (SARUA 2008a), there were 66 such higher education institutions: Angola had one public university (with several regional campuses) for a total national population of 16.5 million; Botswana one for a population of 1.7 million; Democratic Republic of Congo four for 6.5 million; Lesotho one for 2.5 million; Madagascar six for 18 million; Malawi two for 12.8 million; Mauritius two for 1.3 million; Mozambique four for 20 million; Namibia one for 2 million; South Africa 23 for 47.5 million; Swaziland one for 1.2 million; Tanzania eight for 39 million; Zambia three for 12 million; Zimbabwe nine for 12.5 million.

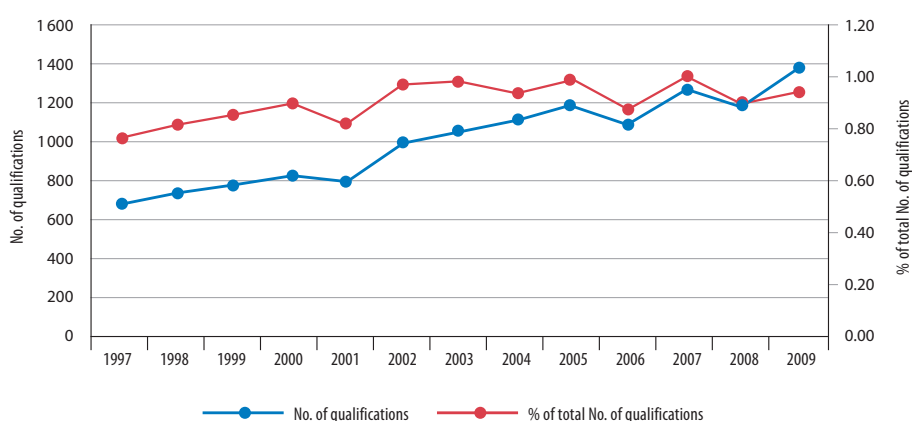
It will immediately be seen from these numbers that South Africa is well above the other countries in the region in terms of the number of public universities. This preponderance is reinforced when university student enrolment is considered: the total for the SADC region as a whole was 1.07 million in 2007, of which 760 889 (71.1 per cent) were enrolled at South African universities. When it comes to the enrolment and graduation of PhD students, the situation for SADC countries (excluding South Africa) is even more precarious:

- SARUA's regional overview revealed that in 2007, out of total SADC student enrolments of 1.07 million students, only 10 578 (1 per cent of the total) were enrolled in doctoral programmes. If the South African contribution is removed from the equation, the total number of students enrolled at SADC's remaining 43 public universities drops to just over 309 000, of whom only 530 (0.17 per cent of the total student population) were working towards their doctorates.

¹ Madagascar's membership of SADC (and the African Union) was suspended following an unconstitutional change of government in 2009, but it remains part of the region.

- Graduation statistics followed this trend. In 2007, out of the total doctoral degrees awarded across the region's public universities, 1 274 graduated from South African institutions and only 143 from the other 43 state-funded universities.
- Interestingly, the discipline-weighting away from the science, engineering and technology (SET) major fields of study that characterises the South African statistics is not repeated in the rest of SADC. Of the 143 doctorates awarded in 2007, 72 (or just over 58 per cent) were in the SET fields, while the other 42 per cent was shared between business, management and law (14 per cent), and humanities and social sciences (28 per cent). The percentages for South Africa in 2007 were 46.3 per cent SET, 5.6 per cent business and commerce, 11.2 per cent education, and 36.9 per cent other humanities.
- Figure 1 (Steyn 2011) shows that the number of doctorates awarded in South Africa increased from 687 in 1997 to 1 380 in 2009, an average annual increase of 6 per cent per annum. The figure also shows an enhancement in the relative importance of doctoral degrees, since the share of doctoral degrees in all higher education qualifications awarded increased from 0.76 per cent in 1997 to 0.95 per cent in 2009.

Figure 1: Number of doctorates awarded in South Africa, and the number of doctorates as a percentage of all qualifications awarded in South Africa for the period 1997 to 2009



It is clear from these comparisons that, within SADC, quite apart from the obvious differences in doctoral outputs between South Africa and the rest of the region, there exists a wide unevenness of skills to cope with the increasing demand for doctoral graduates in the most appropriate disciplines. It is also obvious that higher education in the region, including South Africa, is faced with a challenge that will require regional initiatives if it is to be overcome.

Before coming to grips with some of the recommendations in this regard, it will be worth looking briefly at the situation elsewhere in Africa.

Sub-Saharan Africa

The IAU Sub-Saharan study (IAU 2010) focused on six universities, one each in Cameroon, Nigeria, Benin and Senegal (in West Africa), and Kenya and Rwanda (on the eastern side of the continent). Unlike in the SADC region, where growth (particularly in South Africa) has been steady but small, these universities have experienced what the study report calls 'a phenomenal growth rate' in doctoral student enrolments since 2005. The period began with 373 enrolments across all six universities, and ended (in 2009) with 1 454, an increase of 390 per cent in five years. The study attributed most of this growth to dramatic increases in female enrolment for

PhDs in education, the social sciences and the humanities, resulting in a gender mix of 69/31 in favour of males. (In South Africa, the gender mix of doctoral graduates in 2007 was 58/42 in favour of males.)

But the high growth rate of students entering West and East African universities, as well as the growing realisation of the importance of PhDs when considering the role of higher education in national and regional development, has brought major challenges. The main areas in which these are apparent include institutional governance to cope with doctoral increases and the professional administration of doctoral programmes; the need to develop locally relevant doctoral study programmes; the provision of adequate research infrastructure and doctoral supervision; and funding.

In spite of high growth rates, the basic reality is that not enough PhDs are being produced in the East and West African universities, particularly in the SET subjects. In this way, the situation is similar to that pertaining in the SADC region, and also in South Africa (the continent's most prolific producer of doctoral graduates). Ways have to be found of increasing high-quality output so that higher education can play its part in the development of the continent, the region and at national level.

South Africa and the world

According to the ASSAF PhD study, in 2007 South Africa produced 1 274 doctoral graduates. As indicated in Figure 1, this represents a steady annual rise since the year 1997 (when 687 doctoral graduates were produced). The 2007 value translates into 26 PhD graduates for every million of the total South African population, a number which allows for international comparison. South Africa does not fare well in such a comparison: out of a list of 34 countries, South Africa is placed 33rd. The top country on the list, Portugal, produces 569 PhDs for every million of total population, followed by Switzerland (454), Sweden (427), Finland (375), and Germany (297). Other significant achievers are the United Kingdom (288), Australia (264), Norway (208), the United States (201), France (172), and Japan (132). The last five countries on the list are Turkey (48), Iceland (32), Mexico (28), South Africa (26), and Chile (13).

The majority of countries on the list are European (22), with the Far East and the antipodes (5), the Americas (4) and the Middle East (2) with the fewest. As the only representative from the African continent, South Africa is an important marker.

The country has some unique characteristics, partly due to its divided past:

- In 2007, the most recent year included in the ASSAF PhD study, most of the country's doctoral graduates were white men in their thirties. Females comprised 42 per cent of graduates, while black Africans (who make up nearly 80 per cent of total population) produced only 32 per cent of PhD graduates. The main reason for this disparity appears to be economic, with black graduates frequently under family pressure to earn in the job market, or simply unable to raise the necessary funding to continue their academic careers to PhD level.
- Table 1 (Steyn 2011) shows the distribution of PhD graduates across the major fields of study. The increase in the SET share of the total doctoral graduates (from 39 per cent in 2000 to almost 51 per cent in 2009) is significant since the share of SET graduates in all qualifications awarded were only 25.7 per cent in 2000 and 28.4 per cent in 2009.

Table 1 Comparison of the number of South African doctoral degrees awarded in 2000 and 2009 according to major fields of study

Major field of study	Doctoral degrees awarded		Doctoral degrees (%)		All degrees (%)	
	2000	2009	2000	2009	2000	2009
Science, Engineering and Technology	323	703	39.06	50.94	25.74	28.36
Business, Commerce and Management	26	61	3.14	4.42	21.51	23.30
Education	113	148	13.66	10.72	20.62	24.50
Other Humanities	365	468	44.14	33.91	32.06	23.80
TOTAL*	827	1 380	100.00	100.00	99.96	99.97

* Degrees with unknown major field of study excluded in the case of 'All Degrees'

- The third apartheid-past characteristic that is still evident in the South African higher education system, and that reflects in the country's PhD statistics, is the performance chasm that exists between the formerly white universities and the so-called previously disadvantaged institutions that were specifically created to cater to particular ethnicities (and especially those established in the independent and semi-independent homelands), where the recruitment of high-quality academic staff remains a serious problem. This situation is clearly indicated in the spread of doctoral graduates (in 2007) across the 23 South African universities. The top six PhD-producing universities, all previously white and urban-based, accounted for 65 per cent of the doctorates produced. The bottom six, all previously disadvantaged under apartheid, produced less than 2 per cent of the nation's doctoral graduates.

Challenges facing doctoral education in Africa

When the low performance of African universities (and SADC universities in particular) is placed in an international context, it is not surprising that they compare unfavourably. Almost the whole of Africa endured the traumatic experience of European colonialism, but a high percentage of SADC countries were settler colonies where the struggle for African independence was more protracted, ending only after bitter wars. The history of higher education is enmeshed in these political events. As noted in *Towards a Common Future*:

It is important to locate a discussion on the status of higher education in SADC within the historical context of African higher education (which) has a complex history rooted in colonialism, independence movements, post-independence development efforts and, in many instances, conflicts, followed by construction efforts. Before 1960 few African countries had universities. (SARUA 2008b: 69).

There was genuine enthusiasm for higher education, but by the 1970s most of the continent was gripped by economic crisis, while the 1980s saw the advent of the World Bank's economic structural adjustment programmes and a development aid philosophy modelled on the Pacific Rim experience, which adhered to the principle of 'first the schools, then higher education'. The result of these factors, as well as endemic socio-political unrest in many regions, was that Africa's universities went into decline. Facilities deteriorated and the best academics joined the African diaspora.

This is very much the situation today, although the linkages between universities and reconstruction and development are being more widely understood, both inside Africa and by development

agencies in the developed world. It is certainly the context in which one should view the various analyses to emerge from the research studies being considered here.

The IAU Sub-Saharan study (IAU 2010) identifies six major PhD-production challenges facing all of the six participating universities. They are:

- inadequate facilities, equipment and research infrastructure, as well as limited funding to maintain and expand infrastructure;
- the need to redefine doctoral study programmes and their co-ordination – current administration of doctoral programmes needs to be reviewed and improved;
- inadequate scholarships and research supervisory capacity – the study revealed ‘a real need for more financial support’ for both students and staff (and doctoral supervisors) as a pre-requisite for success;
- shortage of funding to conduct research – the study revealed ‘a continuous decline in funding for research in universities’; and
- inadequacy of knowledge production in relation to country needs – the research identified two related problems: lack of institutional autonomy due to political appointments into senior university positions; and lack of national research systems and strategic planning of doctoral studies which often leads universities ‘to produce inadequate knowledge with little relevance locally, nationally or regionally’.

When it comes to the production of doctoral graduates, how do the challenges confronting the SADC universities compare with these institutions further North? Some answers are provided in SARUA’s research (SARUA 2008b), particularly in the areas of research importance, facilities, staff capacity, and funding.

- *Institutional focus*: it is widely accepted that a university has three basic functions: teaching/learning, research, and community outreach. Clearly the research aspect is of importance when it comes to the production of PhDs. But on average SADC universities focus only 23 per cent of their resources on research, concentrating instead on teaching and learning (65 per cent). In fact, the reported estimate on research may well be lower in universities outside South Africa because between 1990 and 2007 South African universities were responsible for nearly 80 per cent of all research publications emanating from Southern Africa. In short, attention given to research in most SADC higher education institutions is low. A consequence of this is that many talented graduates are tempted to join the African intellectual diaspora, and are often permanently lost to the development of the continent. It should be obvious that one way of encouraging them to return would be to develop more research-driven universities in the region.
- *Staff capacity*: in SADC as a whole, according to SARUA research (SARUA 2008a, 2008b), in 2007 a total of 8 441 academic and research staff held PhD degrees. When South Africa is excluded, the figure drops by 56 per cent to 3 747. Some countries are worse off than others. Zambia has only 12 doctoral graduates teaching in the science, engineering and technology (SET) subjects, while Madagascar has 340. The low-population Namibia has 33 PhD SET academics, but the high-population DRC has only 107. This generates a general academic climate that is not conducive to the production of PhDs.
- *Funding*: nearly three-quarters of SADC universities report that they receive insufficient funding from their ministries of education for ‘effective operation’ (SARUA 2008a). This, often coupled with inefficiencies inside the institution, dampens any efforts to increase postgraduate activities, and contributes directly to the current low production rates of doctoral graduates.

Against the generally gloomy background sketched by the IAU Sub-Saharan study and the SARUA baseline study, how does South Africa fare?

The ASSAF study (ASSAF 2010) reveals a similar set of difficulties that compromise the imperative to produce PhDs at South African universities, although on a different scale. Given the poor performance of even the best of these universities on the international stage, it is necessary to find a benchmark against which to measure the performance of the higher education sector in South Africa. The national Department of Science and Technology (DST) has provided one. One of its planning documents, *Innovation: Towards a Knowledge-Based Economy* (DST 2007), states that by 2018 South Africa should be producing around 6 000 doctoral graduates in SET disciplines each year. This target needs to be seen in relation to the 2010 performance, when South African universities managed to produce only 730 SET PhDs (HEMIS 2010). In a recent study (Steyn 2011) the three most important factors in the production of PhDs were analysed. These factors are the availability of doctoral students, the availability of study leaders for doctoral students, and the throughput of doctoral students. The analysis by Steyn shows that the target of 6 000 a year by 2025 is unattainable, even for the total number of doctoral graduates (never mind SET PhDs).

With these realities in mind, some of the major challenges affecting PhD production in South Africa can be outlined as follows:

- Poor resources and staff in many schools, particularly in the rural areas, and particularly in science and mathematics, limit the feed of potential doctoral graduates from the existing school system into universities.
- The conversion rate from masters degrees to PhDs is too low. According to HEMIS (2010) the masters and doctoral graduates in South Africa in 2010 were respectively 8 633 and 1 421. The constraints here are mostly socio-economic.
- Risk factors contributing to the non-completion of PhD programmes include the age of the student coupled with professional and family commitments, and poor student-supervisor relationships. Older students who might be better equipped to cope with the rigours of working towards a doctorate are often discouraged by the loss of earnings as full-time students, or lengthy periods of study for part-timers.

The study sums up the main barriers to increasing the productivity of PhD programmes at South African universities as: lack of financial support, limited supervisory capacity, the quality of incoming students, and unnecessary bureaucratic rules and procedures surrounding doctoral programmes. Increasing PhD graduate output (whether in South Africa or in SADC as a whole) therefore requires increased funding, more PhD supervisors, an increased supply of adequately equipped students, and more efficient and strategic administration of the system.

It might be instructive to compare these requirements with the ASSAF study's examination of countries that have succeeded in increasing their production of PhD graduates through what the study terms 'six promising practices':

- developing a strategic increase in postgraduate education generally that addresses multiple needs;
- embracing the idea of 'brain circulation', which means circulation between universities, between doctoral programmes, and between the end-users of doctoral-level skills;
- differentiating the higher education system, which means creating centres of specific excellence in specific institutions;

- ensuring international exposure for doctoral students through national initiatives;
- building co-operation and collaboration in doctoral training across different types of organisations (government, academic, civil society, business and industry); and
- introducing graduate or research schools to co-ordinate postgraduate education.

Some of these practices are already present in SADC countries, but they require funding.

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DEVELOPING ACADEMIC TEACHING IN SOUTHERN AFRICA: AN ESSENTIAL CONDITION FOR SOCIAL AND ECONOMIC PROGRESS

Ian Scott

The thesis of this paper is that substantially expanding the production of good graduates is essential for development in Africa, that this has major implications for the structures and approaches of the educational process in higher education on the continent, and that 'teaching development' - that is, improving the effectiveness of higher education teaching and learning for contemporary conditions - is therefore critical to social and economic progress.

The paper considers aspects of higher education participation and performance across Sub-Saharan Africa with the purpose of framing the challenge for teaching development. It focuses particularly on the case of South Africa because, it is argued, the South African experience may prefigure developments elsewhere in the region. Recognition of the centrality of educational expertise and scholarship to the effectiveness of university teaching is seen as a key to meeting the challenge.

What Africa most needs from higher education

The key role of higher education in the contemporary world is widely accepted. It is likewise common cause that the central functions of higher education are to create knowledge - new knowledge and new ways of applying existing knowledge - and to disseminate it, primarily through the production of graduates, with both functions informed by social responsibility.

Both these functions are critically needed in Africa to support all aspects of social and economic development. However, in developing-country contexts where only a thin layer of the population currently benefits from advanced education, it can be argued that the predominant need is for good graduates. Good graduates are essential for creating the conditions for development in many ways, from holding key positions and creating jobs to producing knowledge and educating new generations. Shortages of advanced knowledge are consequently acknowledged to be a major obstacle to progress and well-being across the continent.

It follows from this that it should be incumbent on higher education sectors in Africa to focus primarily on producing graduates of good quality, in the right numbers and in an appropriate disciplinary and demographic mix, to meet the needs of their societies. This should not be at

odds with participating in the international scholarly community but rather a means of strengthening capacity for contributing to world knowledge. The obligation on our higher education sectors to foreground their educational function is underlined by the fact that, while research is increasingly located at non-university sites, the responsibility for producing graduates lies solely with higher education institutions.

If this argument is valid, the key question is whether the higher education system and institutional practices are well-aligned with these priorities. To what extent are our systems effective in teaching and research, and has a productive balance between the key functions been achieved? To what extent can growth in enrolment be successfully accommodated?

Given the importance of higher education output and outcomes for our societies, these issues warrant thorough analysis as a basis for developmental action. The following sections offer an overview of the educational challenges confronting higher education sectors in many Sub-Saharan African countries, including those in the Southern African region.

The significance of higher education participation rates in Africa

Analysing higher education participation in Sub-Saharan Africa is essential to evaluating the effectiveness of the current teaching-and-learning process and assessing the priorities for teaching development.

The key fact is that participation is extremely low, by world standards and in relation to the need for graduates. The average gross enrolment ratio (GER)¹ in 2008 was 6 per cent, compared with 26 per cent for the world, 35 per cent for Latin America, and 70 per cent for Western Europe and North America (UNESCO 2010b). Enrolments are small in terms of absolute numbers: after Nigeria, with its enrolment approaching 1.5 million, South Africa has under a million students, and there are only two other countries (DRC and Ethiopia) with more than 200 000. This clearly affects the prospects of addressing the shortages of advanced skills that are impeding Africa's development.

Moreover, the gap between developed and developing countries is growing, with major consequences for the North-South divide (UNESCO 2010b:57). As a UNESCO report puts it:

These trends have implications that go far beyond the education sector. Tertiary education systems play a critical role in developing the knowledge-intensive skills and innovation on which future productivity, job creation and competitiveness depend in a globalised world. Large and widening disparities in opportunities for tertiary education will inevitably reinforce the already extreme wealth disparities between countries (UNESCO 2011:57).

While little formal information is available below the national level, it is evident that the GERs also mask significant inequalities between groups within the population in a number of countries, along social class, regional, racial or ethnic lines. For example, while South Africa has the highest participation rate among the bigger higher education systems in Sub-Saharan Africa, the GER disparities across its historical racial categories are stark: the overall rate is 16 per cent; for Whites

¹ The higher education gross enrolment ratio (GER) is the total number of students in higher education (of any age-group) in a given year, expressed as a percentage of the 20-24 year-old age-group in the population.

and Indians it is 56 per cent and 45 per cent respectively, not far short of those of the developed world; for the African and Coloured groups it is 13 per cent. This can have serious consequences for social cohesion and also for successful growth in higher education.

The low participation rates also point to a key characteristic of the current student intake in Sub-Saharan Africa. For whatever reasons, the students who gain access to higher education represent the top echelon of the youth in terms of their prior educational achievement. Since the proportion of the youth entering higher education is lower than the GER (as the latter is a gross ratio), in many countries the school-leavers in the intake are in the highest three or four percentiles of their age group. Irrespective of the extent to which they are well-prepared for higher education, they are a very select group, and must collectively have high potential to succeed.

This is the first of two reasons why the performance of the current student body, particularly the completion rates, needs to be known and analysed. With such a small intake, it is essential to national progress that all reasonable measures are taken to enable the students' potential to be realised.

The second reason relates to the need for continuing growth in all Sub-Saharan African higher education systems. Growth is needed to accompany economic development. While education does not necessarily create development, 'the correlation between university enrolment rates and national income is strong. No high-income country (other than Switzerland) has university enrolment less than 50 per cent' (Africa Higher Education 2008). In Sub-Saharan Africa, growth will also arise from pressure from below, from youth demand for access. According to UNESCO, the upper secondary GER in 2008 was more than four times that for higher education (twice the global difference), indicating that 'policymakers across the region can expect further pressure to expand the tertiary education system in order to meet the rising demand' (UNESCO 2010b:1).

Rapid growth is already under way. Tertiary education enrolment in Sub-Saharan Africa has recently doubled in five years, its growth rate of 15 per cent being the highest of all world regions (Africa Higher Education 2008). This should be a positive development; however, as international experience shows, rapid growth or 'massification' can have unintended negative consequences for success rates, internal efficiency, and the quality of graduates. Moreover, since much of the growth in many countries is taking place in private, often for-profit institutions, expansion comes with a range of regulatory and quality assurance challenges with which African higher education ministries and sectors have only a short history of experience.

It is therefore necessary that the performance of current intakes be thoroughly analysed, as this must provide the basis for responsible planning of future growth, to ensure quality, optimal use of resources and the protection of the public good. The following sections offer an overview of key patterns and issues, with particular reference to the case of South Africa.

Student performance patterns

Sub-Saharan Africa

There is no reliable information on success and completion rates for Sub-Saharan Africa as a whole, and little on most individual countries in the region. The Harvard-based Africa Higher Education survey (2008) tentatively estimated an average Sub-Saharan dropout rate of 50 per cent but this was acknowledged to be based on very tenuous information. However, even if the

completion rate is as high as 70 per cent, low participation rates mean that only about 4 per cent of the youth are graduating in the region, and that in no Sub-Saharan African countries bar South Africa, and possibly two small ones, will this number exceed 7 per cent.

Comparison with other countries' completion rates is not very meaningful because of the large differences in participation. It may be noted, however, that the OECD average a decade ago was around 70 per cent, with some countries going above 80 per cent (OECD 2009). Moreover, the average percentage of young people in OECD countries who had graduated with a university degree (i.e. excluding vocationally-orientated tertiary education) was close to 40 per cent in 2009 (OECD 2011:21). The huge disparity between the proportions of Sub-Saharan African and OECD countries' youth holding a higher education qualification highlights the North-South divide in this key area of development.

In Sub-Saharan Africa, the significance of student performance is greatly heightened by the challenges that arise from the need for continuing growth. Because of the scarcity of resources and the imperative of making the best use of the academic talent in all communities, all reasonable effort must be made both to improve the current completion rates and to ensure that quality and performance do not deteriorate with enrolment growth. This calls for thorough analysis of current performance patterns in each system, and of factors that facilitate or impede student progression.

The case of South Africa – particularly the underlying shortcomings and obstacles that have emerged in the democratic era – may be instructive in considering how to improve the effectiveness of higher education across the region. Despite significant contextual differences between the various countries, South Africa's case is of interest because of the size and diversity of its higher education sector, and the effects of widening participation that it has encountered so far. Allowing for the contextual differences, South Africa's experience may prefigure that of other African higher education systems in key ways, so its lessons and caveats may be useful in informing analysis and development in other countries.

South Africa

Real progress has been made in aspects of South African higher education since the political transition in 1994, especially in removing apartheid legislation, creating a single system from the highly fragmented previous dispensation, substantially increasing enrolment overall and of African students in particular (African enrolment was 65 per cent of the total in 2009), and massively increasing student financial aid.

However, major shortcomings remain. Despite the growth in African enrolment (which occurred from a low base), a fourfold inequality in participation persists. This is compounded by poor completion rates overall and among African and Coloured students in particular. Key facts about the current performance patterns (adapted from Scott, Yeld & Hendry 2007) are given below.

A five-year cohort study² of the 2006 intake of first-time entering students undertaking three-year degree and diploma programmes and four-year professional degrees, showed the following patterns. Studies of earlier cohorts, viz. those of the 2000, 2001 and 2005 intakes, indicate that the overall patterns are robust.³

2 These cohort studies track the performance of all first-time entering students in the given year until they graduate or leave without graduating, over a period of five years.

3 The data here draw on performance patterns published by the South African Council on Higher Education (CHE) in 2007 (Scott, Yeld & Hendry 2007), but the figures have been updated on the basis of as yet unpublished research commissioned by CHE's Investigation into undergraduate curriculum structures in South Africa.

- Graduation within five years sector-wide: the completion rate for the full cohort was only 35 per cent. Allowing for students taking more than five years to graduate and for a proportion returning to higher education after initially dropping out, the final cohort completion rate is estimated to be 45 per cent. Thus more than half of a relatively small intake is being lost to higher education.
- Graduation within five years excluding distance education: if the distance education university, Unisa, is excluded on the grounds that distance education students can be expected to take longer to complete their studies, still only 48 per cent of entering students graduate within five years. Allowing again for later completion, at least 45 per cent of these highly selected students will never graduate.
- Graduation in regulation time excluding distance education: the proportion of 'contact' students (i.e. excluding distance education students) graduating in the time intended (e.g. three years for a three-year degree) is an important indicator of the health of the system. In the 2006 cohort, only one in four students graduated in the regulation time.
- First-year attrition: this is another key indicator of systemic faults. One in three students failed or dropped out in the first year, representing a loss of 42 000 from the relatively small intake of 127 000.
- Especially poor performance in science, engineering and technology (SET): performance patterns are consistently poorest in these subjects, which have special significance for development, and in which skills shortages are generally greatest.
- Equity: African and Coloured student attrition is substantially higher than in the other groups. A most troubling finding is that only 5 per cent of African and Coloured youth are succeeding in any form of higher education. The persistence of these inequalities has serious implications for social cohesion in South Africa, for economic development, and also for growth in the system.
- Effects on the pipeline to postgraduate study: South Africa is producing half as many doctorates per million of population as Brazil, and one tenth of the Australian output. Efforts to grow postgraduate programmes are likely to be increasingly thwarted by the shortage of good graduates, especially in SET disciplines.

South African higher education can thus be said to be a 'low-participation, high-attrition' system (Fisher & Scott 2011:1). Some implications of the South African case for the region are discussed below.

Implications for the educational process in higher education

The effects of low levels of graduate production in Sub-Saharan Africa, whether arising from low participation or poor success rates or both, are critical. South African higher education, even though it has the highest participation rate of the larger countries in the region, is far from achieving the graduate output that would meet national needs in terms of development or social cohesion. This applies to all Sub-Saharan African countries: development is severely constrained, and the small size and elite nature of the student body stands in the way of equity of opportunity for under-represented groups.

Improving the numbers, quality and mix of graduates is central to achieving a wide range of social goals, especially the following:

- economic and social development;
- individual advancement and a route out of poverty for large numbers of people and their families;
- producing the numbers and kinds of school, technical, vocational and adult educators that

- can expand the reach and increase the effectiveness of pre-tertiary education at all levels;
- establishing a strong pipeline to postgraduate studies, and hence strengthening professional competence, research training, and the creation and application of knowledge; and
- producing the next generation of academics to continue the cycle.

The importance of these goals warrants concerted effort to identify interventions that can make a substantial difference, through improving current performance and establishing a sound basis for successful growth. Key considerations that have emerged in recent years, particularly from the South African experience, are outlined below.

Access and success

Access without success is a hollow achievement. This should go without saying, yet systems across the world continue to focus on broadening access without giving equal attention to research and interventions designed to ensure that a high proportion of the student body can succeed. In some cases, output and outcomes are scarcely measured or analysed at all. In South Africa, there has been very large state investment in increasing enrolment and student financial aid, yet the performance patterns show a poor return in terms of graduates. For example, it was reported in 2008 that over ZAR 4 billion a year is being spent on direct state subsidy and grants that do not result in graduates (Letseka & Maile 2008:5).

Access is obviously a necessary component of improving equity but it is the outcome – graduation – that counts, for the individuals and society. In fact, where performance patterns are poor, it can be demonstrated by means of projections that simply increasing access is the least effective and cost-efficient way of increasing graduate output. Improving the performance patterns – which depends on improving the effectiveness of the teaching-and-learning process – is the key to graduate growth. This is an imperative for South Africa if it is to meet both development and equity needs. It is equally important for all other Sub-Saharan African higher education sectors to ensure that they do not become low-participation, high-attrition systems.

Systemic problems require systemic solutions

High attrition is not uncommon in higher education around the world, but it occurs predominantly in high-participation systems. The South African challenge is that it is happening in a low-participation environment, where only about 13 per cent of all youth, and only 10 per cent of the youth of the majority population group, are entering higher education. Poverty and poor schooling are undeniably major causes of under-preparedness for higher education. However, assuming that educability – the capacity to respond to effective teaching – is randomly distributed across populations, the top decile of the youth must collectively have strong potential to succeed in higher education. The view expressed in academic circles that many of the current intake ‘do not belong’ in higher education is thus not well-founded.

High levels of failure and dropout within a small and select intake must be attributed to systemic problems rather than individual shortcomings on the part of the students or, for that matter, the teaching staff. In South Africa, much poor student performance can be traced to the mismatch or ‘articulation failure’ that exists between secondary and tertiary education, which has resulted from historical structural problems. These include, for example, the fact that higher education curriculum frameworks and assumptions were inherited from the former colonial dispensation many decades ago, and have not been modified to meet the needs of the changing student intake.

Again despite contextual differences, many other Sub-Saharan African systems are also affected by systemic faults. Major discontinuities between the main education phases – such as between the junior and senior secondary phases, as well as between secondary and tertiary education (UNESCO 2011) – clearly have a powerful influence on higher education access and success. This is commonly regarded as a resource problem, but as higher education enrolment increases, it is most likely that educational discontinuity and articulation gaps will be uncovered as obstacles to student progression.

Systemic problems of this kind cannot be effectively addressed by marginal measures, but require systemic solutions. What parts of the education system should take responsibility for providing the solutions is discussed briefly below.

Whose responsibility is it to improve completion rates?

Factors external to higher education – especially poor socio-economic circumstances and educational background – are clearly primary influences on higher education performance in Sub-Saharan Africa. There is no doubt that efforts to address these social ills must not be relaxed. However, there is a vicious circle here: good schooling and poverty alleviation hinge considerably on the availability of good graduates.

If higher education is to depend on factors beyond its control to address under-performance in the sector, then it must be sure that sufficient improvement in these external conditions will occur. In the South African case, there is a reluctant but growing recognition that higher education cannot, for the foreseeable future, rely on the pre-tertiary sectors to produce the numbers of traditionally well-prepared candidates for higher education that would be needed to bring about substantial improvement in performance. If the status quo is to change, the higher education sector, supported by the state, has to take developmental action in areas that are within its control.

In considering systemic obstacles to growing graduate output, each country clearly has to make its own assessment of what sectors of the education system as a whole can feasibly make effective contributions to success and successful growth in higher education, and what precisely these contributions are. Two key points are evident here. First, such assessments must be realistic and pragmatic, based on what *is* actually the case rather than on what *ought to be*. Second, given the circumstances in which most Sub-Saharan African higher education systems were inherited from colonial times – particularly the small, homogeneous and relatively privileged student bodies they were predicated on – it is unlikely that higher education will be able to grow successfully on the basis of business as usual.

Improving performance by addressing factors that are within higher education control

As argued earlier, because of the thin layer of the population with access to good schooling, growth in higher education in most African countries inevitably results in increasing the proportion of underprepared students in the intake. The question is what can be done to avoid deterioration in performance.

If higher education is willing to make its own contribution to improving student performance, it is necessary to identify what factors within its control can have a substantial effect on improving student learning, particularly in order to facilitate successful growth. Two such factors are highlighted here.

One factor is institutional climate. It is well established, through research and experience, that non-academic factors – affective and material – play a key part in promoting or discouraging student learning. Creating an institutional climate that is inclusive and supportive, particularly in relation to the increasing numbers of talented but educationally disadvantaged students who are entering higher education, is thus an important means of facilitating retention and graduation. Establishing such a climate is very much about attitudes and tolerance of difference, so it is not necessarily resource-intensive. This complex topic is outside the scope of this paper, but its importance should be noted.

The second factor is the teaching and learning process itself. While educational structures and approaches are commonly so embedded in a university's culture that they are seldom examined, the South African experience has shown that adjusting them to the realities of students' educational backgrounds can contribute greatly to realising student potential. The teaching and learning process is thus a key variable affecting who succeeds in higher education, particularly in developing countries where so many talented students are under-prepared for traditional forms of higher education provision (see for example Scott, Yeld & Hendry 2007). In reviewing the teaching and learning process, it may be useful to consider it under two broad headings.

- *Curriculum structures*: all curricula are based on assumptions – implicit as much as explicit – about students' prior learning. In the South African case, analysis over many years has indicated that one of the main obstacles to student learning is that the assumptions embedded in our curricula are no longer valid for a large proportion of the student body, and it is not possible to change them within the tight confines of the traditional curriculum structures. This applies particularly (but not exclusively) to the talented but disadvantaged students who already make up the majority of the intake. There is growing recognition, in government and parts of the higher education sector, of the need to re-think the inherited curriculum framework, with the aim of improving current performance patterns and establishing a sounder basis for future growth. The extent to which this issue may apply in other Sub-Saharan African systems is not clear, but evidence of structural constraints would justify its inclusion on the agenda for review.

In addition to the issue of macro-structures, contemporary conditions are also calling for fresh curriculum and course design at a range of levels and for a range of purposes, from incorporating new knowledge to coming to terms with new information technologies and sources of learning materials. In seeking to modernise their systems, a number of African countries are already committing themselves to policy – for example, on credit accumulation and transfer – that has significant implications for curriculum design at programme and even module level.

- *Pedagogical approaches*: equally important for improving higher education outcomes is that, like curriculum structures, academic teaching approaches should be matched to the realities of the changing student intake. Because of societal and technological developments, the conditions under which higher education teaching is taking place are in flux. Moreover, the requirements of academic teaching are changing rapidly, for at least three major reasons. The first is decreasing levels of student preparedness as a consequence of conditions in schooling and enrolment growth, as discussed extensively in this paper. The second is generational change, which has resulted in different modes of learning among the youth, occasioned by the prevalence of new information and communication technologies. The third is far-reaching change in the nature of work and employment, career paths and life aspirations, which is affecting the relationship between different forms of knowledge and skills, and places a premium on adaptability and lifelong learning.

In these circumstances, traditional forms of university teaching are under increasing pressure, and in the South African case are evidently increasingly less effective. Apart from the factors outlined above, the challenge of language – where the language of instruction is not the mother tongue of the majority of students – is prominent in South Africa. Insofar as these conditions are present in other Sub-Saharan African countries, the need to critically examine traditional teaching approaches applies across the region.

It may be evident, then, that if graduate numbers and quality are to be improved to meet the needs of development, then building the capacity of academic teaching staff to adjust to changing conditions and student profiles, and to meet the challenges to traditional higher education approaches, calls for attention and action. The following sections outline some key issues.

Key characteristics of effective teaching development

Analysis of the kind set out above offers a basis for defining the goals and setting the agenda for developing the quality and effectiveness – the fitness for purpose – of academic teaching in Sub-Saharan Africa. The next question is what kind of teaching development is likely to be most successful in building the capacity that is needed in educational design, assessment and pedagogical approaches.

It is often remarked that academic teaching is the world's only profession for which no formal training is required – knowledge of the discipline, rather than knowledge about imparting it, is regarded as sufficient. However, the changing conditions outlined above challenge this traditional assumption.

The nature of academic work and of academic staff means that it is not feasible or desirable to try to provide, let alone insist on, training that covers the multiple aspects of the teaching and learning process. Rather, in keeping with the direction that much of tertiary education itself needs to take, teaching development should focus on the key concepts and intellectual tools that academic staff should find valuable for addressing the changing demands on their educational role. In other words, what is needed is for academic staff to acquire at least a foundational level of systematic knowledge about teaching and learning.

Historically, this kind of knowledge has not been regarded as necessary and in many cases has been resisted in the academic community, which has instead depended primarily on 'craft knowledge' of teaching – that is, teaching as you were taught. Craft knowledge has served well in traditional teaching situations but, since it has no systematic or theoretical foundation, it breaks down in the face of teaching problems that the staff are not familiar with, which is what is increasingly occurring.

Kreber (2002) usefully contrasted craft knowledge with 'teaching expertise', which is based on systematic and scholarly knowledge. In the African context, this might be better called 'educational expertise', to signal that it refers to all aspects of the educational process, including curriculum design.

It is not suggested that all academics should become educational specialists; this would not be realistic or necessarily desirable, given the competing demands on academic time. However, the great advantage of developing educational expertise is that it provides academic staff with analytical tools for understanding and responding effectively to changes in teaching conditions, the student body, and demands on the curriculum. As a recent South African report put it,

'Academic work today is much more demanding than before [...] Academics require pedagogic expertise [...] (They) must navigate and undertake their responsibilities within a complex context' (HESA 2011).

A key element of developing educational expertise, which would be embraced by staff with a special interest in teaching, would be building capacity for educational research and evidence-based educational development. Educational expertise must be based on scholarly principles, and is hence linked to the international Scholarship of Teaching and Learning movement (see for example ISSOTL 2012).

Another linked matter is the growing international drive to 'professionalise' academic teaching, not only through developing educational expertise but also through providing and accrediting formal qualifications at various levels. The extent to which this is feasible in Sub-Saharan Africa is not known, but such a development would benefit greatly from regional co-operation.

Conditions for developing expertise in academic teaching

Considering the importance of improving graduate production, there are relatively few academic teaching development programmes in Sub-Saharan Africa, although there is growing recognition of the need and some national projects include professional development components. The shortage of opportunities is clearly a hindrance. In the South African case, there is a wider range of provision than elsewhere, including diploma, masters and doctoral degrees in higher education studies and in subject-specific areas like tertiary science and health education. There are also many non-formal programmes. However, such opportunities are utilised by only a small proportion of academic staff.

This points to the internationally widespread experience that the main impediment to teaching development is not a shortage of opportunities but the lack of engagement with them by academic staff (see for example Elvidge 2004). There are weighty reasons for this. In general terms, teaching is widely regarded in the academic community as inferior to research, on the following grounds:

- Teaching, especially undergraduate teaching, is not regarded as intellectually rigorous. As discussed above, teaching in higher education has been predominantly based on craft knowledge, and not seen as requiring theoretical underpinning or professional training.
- Teaching is generally no longer seen as a manifestation of scholarship (as opposed to the scholarly nature of research and disciplinary knowledge). This contrasts strongly with older, non-Humboldtian university traditions of scholarship, and with the widely-known case made by Boyer & Associates at the Carnegie Foundation for the Advancement of Teaching, that teaching should be recognised as a legitimate (and essential) expression of scholarship in its own right (Boyer 1990).
- The field of tertiary education is commonly and persistently not accepted as an intellectually demanding area of study and research. This view, often explicitly or implicitly included in criteria for promotion or awards, is difficult to justify since the way people learn is an important field of scientific inquiry.
- Teaching is not recognised as a valid basis for academic career advancement or international mobility.

In short, the goal of developing educational expertise runs counter to mainstream academic culture in many institutions. Pursuing the goal thus involves influencing hearts and minds.

A key question, therefore, is what conditions need to be established to facilitate the willing and creative engagement of academic staff in their professional development as educators. A full discussion of this complex matter is beyond the scope of this paper, but the following observations arise from identifying the obstacles.

The central point is that success in teaching development depends on substantially raising the status, recognition and rewarding of teaching. This can be achieved in several ways such as:

- recognising and emphasising the importance of educational expertise in national development and institutional advancement;
- consequently raising the level of professional accountability for the outcomes of teaching;
- recognising tertiary education as an intellectually challenging field of scholarship and research, through inclusion in criteria for promotion and research grants;
- balancing teaching and research achievement in institutional performance management and reward systems; and
- ensuring the availability of strong professional development opportunities for academic staff, where possible linking teaching and research.

In conclusion: The importance of the value proposition for academics in Southern Africa

Academics in African universities must inevitably spend the majority of their time teaching, much of it in challenging circumstances. Therefore, if teaching (in all its facets) is not made an integral element of the intellectual challenge of an academic career – and hence of academic respect and reward – it is not clear how we will be able to retain intellectually gifted people in our universities.

There are resource constraints, but the question is whether we can afford not to do this. If teaching expertise is not respected, developed and rewarded, the academic career will be increasingly unattractive, and recruiting the right academic staff will be increasingly difficult and expensive. In such circumstances, higher education will not be able to fulfil its primary obligation of meeting our societies' developmental needs.

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FUNDING MECHANISMS FOR DOCTORAL EDUCATION IN THE SADC REGION

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The absence of sufficient funding for higher education, including the lack of incentives specifically for doctoral education, has been identified as one of the critical factors that contribute to the low representation of doctoral graduates in universities in Southern Africa. In order to begin to address this critical gap, a review needs to be conducted of current funding mechanisms for higher education in SADC countries.

This paper constitutes a partial assessment, made on the basis of available information, of higher education funding policies and practices in Southern Africa. It includes a review of funding policies and mechanisms for doctoral education in some SADC countries and elsewhere in Africa. Background information is given on the trends in enrolments for doctoral students and doctoral degrees awarded in SADC countries.

For illustrative purposes and as a result of the lack of applicable information for many SADC countries, special attention is given to the South African case. South Africa has a well-developed higher education management information system (HEMIS) and a long history of funding higher education by means of subsidy formulas in which doctoral enrolments and graduate throughput are important indicators. Structures for earmarked state and private funding of doctoral studies by means of bursaries and scholarships are also well-developed in South Africa.

The final section of the paper outlines the most promising funding policies and incentives for doctoral education in the region, and provides some specific recommendations.

Financing higher education in Africa

Funding for higher education is usually by means of three income streams: government allocations through the higher education vote (first stream), study and tuition fees (second stream), and income not derived from these two sources (third stream).

A comprehensive analysis of the funding mechanisms for higher education on the African continent can be found in a World Bank document, *Financing Higher Education in Africa* (World Bank 2010). The report addresses a number of issues ranging from the rising social demand and

the challenges of sustainable financing of higher education, to the main features of current funding policies. The rapid growth in student enrolments was identified as one of the major threats to sustainable funding of higher education. Although Africa has maintained an acceptable level of funding higher education in the past 15 years (approximately 0.78 per cent of GDP, and around 20 per cent of its current public expenditure on education), the real growth in higher education budgets is starting to lag behind the growth in student numbers. This results in a decline in public expenditure per student, and is having an adverse impact on the quality and relevance of educational programmes, especially at masters and doctoral levels (including more teaching and less research).

International aid in support of higher education is becoming increasingly important because the tax base of the African countries is generally low and the higher education budget is stretched to its limit. The World Bank study indicates that international aid for education amounts to, on average, US\$600 million per annum. One quarter of this aid goes to the education sector in Sub-Saharan Africa, with most of the aid being for basic education. Further diluting this figure is the fact that only 26 per cent of the aid to higher education goes directly to African universities and research centres, while the remainder is provided for scholarships abroad or is accounted for by directly paying the student costs to the donor university.

A broad overview of current funding practices is contained in the World Bank report. In general, budgetary practices in most African countries remain largely traditional and are based on the previous year's budget allocation, adjusted incrementally to take into account the country's economic performance and revenue.

In broad terms, the allocation methods employed by African countries can be categorised as follows:

- historically-based (incremental adjustments based on the previous year's budget)
- input-based (for example, number of staff, student enrolment, and cost per student)
- performance-based (for example, number of graduates, rate of student repetition, number of minority students)
- earmarked budget (for example, to correct inequalities of the past)
- performance contracts
- competitive funds (for example, bidding for funds to address new initiatives)

Table 1 (World Bank 2010: 47) shows the choices of the budgeting modality that institutions may apply for. Each of the choices encourages a different type of behaviour, requires different capacities to generate institutional statistics, and has a different impact on the sector.

Table 1 Budgeting modalities

Budgeting modality	Key features	Requirements for data and technical expertise	Impact on sector performance
Historically-based	Rewards negotiation skills	Minimal	Maintains status quo
Input-based	Rewards expansion of inputs	Moderate	Encourages growth
Normative	Rewards adherence to defined norms	Moderate	Encourages uniformity
Performance-based	Rewards outcome achievements	Considerable	Encourages quality and relevance

The World Bank report (2010:42) also provides insight into which African countries employ the different budgeting modalities categorised above. This is illustrated in Table 2 below. South Africa has the most advanced funding mechanism for higher education, in that it employs a formula-based allocation using input and output parameters as well as performance measures for the operating and investment budgets.

Table 2 Methods of allocating the higher education budget in select African countries

Operating budget	Investment budget
Historically-based budgets	Performance contracts
Angola, Benin, Burkina Faso, Camaroon, Central African Republic, Chad, Democratic Republic of Congo, Eritrea, Ethiopia, Gabon, Gambia, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Namibia, Niger, Sierra Leone, Sudan, Swaziland, Togo, Zambia, Zimbabwe	Côte d'Ivoire ² , Mali ² , Mauritania ² , Senegal ²
Input-based budgets	Earmarked funding
Ghana, Kenya, Mauritius ¹ , Mozambique, Nigeria, Rwanda, Tanzania, Uganda	South Africa
Funding formula	Competitive funds
South Africa	Ethiopia, Ghana, Mozambique, South Africa, Tanzania ¹

1. In process of implementation (Pillay 2008 for Mauritius; World Bank 2008b for Tanzania)

2. Announced, but current implementation status is uncertain

Other countries are starting to adopt more innovative higher education budgetary practices, and are moving away from historically based budgets. Kenya and Rwanda, for instance, use the cost per student as one of the parameters in the allocation mechanism. Nigeria and Ghana use normative costs derived from prescribed student-teacher ratios as drivers in their model. Ethiopia, Ghana, Mozambique and South Africa supplement the core budgets of universities with competitive funds to stimulate qualitative infrastructure improvements, research and partnerships.

The income stream of some African universities is enhanced by cost-sharing through the charging of student fees. The World Bank report indicates that in 2009 at least 26 countries in Africa charged either student study fees or other types of fees. On average, higher education institutions generate about 30 per cent of their income from these sources (ranging from less than 5 per cent in Zimbabwe and Madagascar to 75 per cent in Guinea-Bissau). Even in Francophone countries, such as Benin, where free higher education has long been a practice, some public universities have reverted to charging fees for professional programmes or for programmes of excellence.

It is clear that state expenditure on higher education is inadequate to extend and enhance the doctoral and research programmes at universities, particularly in the SADC region. Large and growing student-lecturer ratios are of particular concern, as this erodes the capacity to provide quality guidance and mentoring of doctoral students and research outputs. The Higher Education South Africa (HESA) report on a programme to develop the next generation of academics alludes to the fact that public funding is inadequate and that students have to contribute significantly to their studies (HESA 2011). The imperative for prolonged funding of studies may prevent talented and eligible students from pursuing postgraduate (and specifically doctorate) studies. Public funding should be supplemented by new funding that is mobilised by other government agencies and the private sector.

The concept of student loans has existed in Africa for more than 50 years, with loan programmes having been proposed as early as 1952 in Lesotho and 1966 in Botswana. The first fully-fledged loan programmes were introduced in Nigeria in 1973 and Kenya in 1974. As of 2008, at least 13 African countries have operational loan programmes, and several more are considering establishing programmes (including Burundi, Mauritius, Mozambique and Uganda). The main challenge that all countries face with regard to student loan or grant schemes is the very low recovery rate of the loans. The unsuccessful tracking of students who default on their repayments is given as one of the reasons for the unsustainability of some loan schemes. The success of these loan schemes must be measured not only by whether they meet their specific programme objectives, but also by whether they are financially sustainable, as without sustainability the programme will not survive, whatever its objectives. A loan's political acceptability is also critical for its long-term survival.

Income and expenditure of universities associated with doctoral education

It is sometimes theoretically possible (in the case of South Africa, for example) to determine the total annual amount included in the government allocation to a university which could be attributed to student enrolments for doctoral studies and the awarding of doctoral degrees. It is also relatively easy for a university to annually calculate the study fee income associated with doctoral studies.

However, apart from the value of bursaries and scholarships awarded to doctoral students in a particular year by a specific university, it is very difficult (if not impossible) to estimate the total expenditure of a university in a given year on doctoral education. Doctoral education forms part of many of the activities performed from day to day at a university. In the case of South Africa the actions involved in doctoral education (according to HEMIS) mainly form part of the instruction programme, the research programme and the academic support programme, but some doctoral education activities are distributed among other university programmes. Furthermore, expenditure on doctoral education involves staff remuneration (academic and administrative), the acquisition and maintenance of fixed assets (equipment, library collections and buildings), as well as current expenditure (stationery, subsistence and travel, services, etc.). Although the annual financial statements on a university's expenditure (submitted according to South African HEMIS policy) give a breakdown according to HEMIS programme and type of expenditure, it is not sufficiently detailed to calculate the total expenditure from the first two income streams associated with doctoral education. Since government allocations to universities in South Africa are mostly not earmarked (only 28 per cent of the total allocation for the 2012 academic year is earmarked, including NSFAS) there is no obligation on any university to spend their government allocations in accordance with the way it was generated, apart from the earmarked allocations. Many universities in South Africa believe that even the earmarking of 28 per cent of their government subsidy is a breach of their institutional autonomy.

As a result of the earmarked nature of third-stream income it is mostly possible to calculate the annual expenditure on doctoral education for this income stream. This type of calculation is, however, not usually performed.

If it is necessary (or even compulsory) for universities to annually calculate (or estimate) the cost of doctoral education, additional information will be needed. Detailed timesheets on the various activities performed daily by every staff member will have to be collected for this calculation. This information will have to be more detailed than the existing HEMIS staff reporting. The completion of staff timesheets remains a sensitive issue among university staff.

The income and expenditure information collected by SARUA on 20 universities in ten SADC countries (SARUA 2008a and 2008b) is unfortunately also not sufficiently detailed to make any estimate of the income or expenditure associated with doctoral education at these universities.

Funding doctoral education by means of a funding formula

The World Bank study indicates that South Africa has the most advanced funding mechanism for higher education on the African continent. It may be beneficial, therefore, to discuss the South African funding formula in more detail, especially as far as the funding of doctoral education is concerned. It is, however, important to remember that in most countries it is difficult to isolate the explicit funding for doctoral education within the broad governmental allocation to the higher education system or to individual universities.

The history of formula funding for higher education in South Africa

Following the installation of the new democratically elected government in 1994, a review of higher education policy was undertaken, culminating in the Department of Education's *Education White Paper 3: A Programme for the Transformation of Higher Education* (1997), in which the restructuring of the higher education sector was envisaged. The restructuring took effect in 2004. The existing 21 universities and 15 technikons were restructured through a merger and incorporation process that resulted in 23 institutions: 11 universities, 6 universities of technology, and 6 comprehensive universities. The term 'university' refers to an institution that offers under- and postgraduate programmes up to doctoral level (focusing on the fundamental principles of academic disciplines) and undertakes research. 'University of technology' is a South African term for the former technikons, and 'comprehensive university' is a South African term for an institution that came about through the merging of a university and a technikon.

The restructuring of the higher education system has necessitated the development of a new higher education qualifications framework (HEQF), which was published in 2007 (Department of Education 2007). A phased approach to the implementation of the HEQF is currently being followed. It is envisaged that the framework will provide for structured (course-work) as well as research PhDs. This framework forms the basis for establishing a unified qualification structure for a single co-ordinated higher education sector. The policy objectives are clearly stated as follows:

The policy also provides the basis for integrating all higher education qualifications into the National Qualifications Framework (NQF) and its structures for standards generation and quality assurance. It is the basis for the coherence of the higher education system and for the progression and articulation of qualifications, thereby enhancing the flexibility of the system and enabling students to move more efficiently over time from one programme to another as they pursue their academic or professional careers.

The Council on Higher Education (CHE) has the mandate of advising the minister of education on higher education matters. According to the Higher Education Act 1997 (Act 101 of 1997), the CHE must assess whether a programme to be offered by a higher education institution complies with the qualification framework guidelines, and advise the minister to that effect. If the programme is approved by the CHE, government indicates whether it will be funded by the Department of Education.

The transformation and restructuring of the higher education system led to the rethinking of government's funding principles for the sector. In the mid-1950s, the main elements of higher education formula funding in South Africa were established following an enquiry by the so-called Holloway Commission. Although the Holloway formula was revised a few times, it took into account (a) the basic teaching needs of an institution (the costs of setting up teaching departments, independent of the number of students enrolled), (b) teaching needs related to student numbers (faculty, library, laboratories and other variable costs), and (c) an additional component to reflect a 'cost of living' (inflation) allowance for staff.

Later, the government of the time became aware of certain shortcomings in the Holloway formula, and instituted the Van Wyk de Vries Commission to investigate the changing environment of higher education, and the establishment of racially separated universities in some of the 'homelands'. After an interim report by the commission in 1969, the Holloway formula was suspended and universities were funded on an ad hoc basis until a new funding formula was developed.

The new Van Wyk de Vries formula was introduced in 1975, followed in the early 1980s by a comprehensive management information system known as SAPSE (South African Post-Secondary Education Information System), which was based on the broad principles of a similar system developed in the US.

A revised subsidy formula, using the information received from the SAPSE information system, was introduced in 1983. The main driver of the SAPSE funding formula was the number of 'effective subsidy students' (ESS), defined as the average of an institution's weighted full-time equivalent students and the weighted degree-credit full-time equivalent students. (A degree-credit is awarded if a student has successfully completed the module for which he or she was enrolled.) The level of the modules, the subject matter (content) of a module, and the mode of instruction (contact or distance) determined the weights in the formula, with the doctoral level weighing the most (four times the undergraduate level).

The formula also provided for projecting growth in ESSs so as to overcome the lags in processing the data used in calculating the formula amounts, inflationary adjustments through a system of cost units, and a capital expenditure allocation if the number of ESSs exceeded a previously projected maximum.

The SAPSE formula was first applied only to universities, and later extended to the technikons in 1986. The coefficients in the formula were adjusted in 1993 to take account of changes in some of the cost factors. The SAPSE formula was applied until 2003 when the new funding framework (NFF) came into effect (Ministry of Education 2003). A migration period of three years between the old SAPSE formula and the NFF was allowed to minimise possible discontinuities in the subsidy allocation to institutions.

Developments in formula funding in South Africa since 1994

After assuming office in 1994, the new South African government argued that the higher education system was inefficient, and that government should be able to steer the higher education system through its funding mechanism - on the one hand to encourage students to enrol for the courses that government considered necessary for the economy, and on the other to persuade the universities to implement the government policy of non-racialism. This would be achieved through three instruments:

- A new funding framework (NFF) would provide financial incentives to students and institutions to do what government thought best. The NFF was designed to give the minister of education the ability to increase funding in those areas that government wanted to encourage, and to decrease funding in those areas that were believed to be unimportant.
- By a new programme approval process, government would determine the programmes and qualifications that each institution could present, and also determine the number of students it would subsidise at different levels (undergraduate, postgraduate, etc.) for each of the approved programmes. This instrument is referred to as the programme and qualification mix (PQM).
- Whereas in the past the payment of subsidies to universities was driven by student demand for places in particular programmes, it was decided that enrolments should be planned to achieve greater alignment with the needs of the economy.

The NFF was implemented at the beginning of 2004. The process for rationalising the PQM of each institution began in 2003 and is ongoing.

The new funding framework in South Africa since 2004

Table 3 Government budget allocation to higher education for three-year cycle

	Actual distribution		Estimated distribution			
	2009/2010 R million		2010/2011 R million		2011/2012 R million	
1 Block grants	12 701	75.86%	14 533	76.20%	16 387	74.50%
1.1 Teaching inputs	8 497	50.75%	9 793	51.33%	10 909	49.59%
1.2 Institutional factors	885	5.29%	850	4.46%	947	4.31%
1.3 Teaching outputs	1 778	10.62%	2 053	10.76%	2 306	10.48%
1.4 Research outputs	1 541	9.20%	1 837	9.63%	2 225	10.11%
2 Earmarked grants	4 041	24.14%	4 575	23.83%	4 936	25.50%
2.1 NSFAS	1 445	8.63%	1 591	8.19%	1 970	12.02%
2.2 Infrastructure and output funding	1 462	8.73%	1 585	8.31%	1 615	7.43%
2.3 Clinical training for health professional	300	1.79%	330	1.57%	350	1.59%
2.4 National institutes	35	0.21%	39	0.20%	41	0.19%
2.5 Establishment of two new universities					50	0.23%
2.6 Foundation programmes	146	0.87%	185	0.97%	177	0.80%
2.7 Teaching development	345	2.06%	394	2.07%	420	1.91%
2.8 Research development	197	1.18%	166	0.87%	7	0.03%
2.9 Veterinary sciences	67	0.40%	102	0.53%	116	0.53%
2.10 Multi-campus			148	0.78%	148	0.67%
2.11 Interest and redemption on loans	41	0.24%	31	0.16%	19	0.09%
2.12 African Institute for Mathematical Studies	3	0.02%	4	0.02%	4	0.02%
2.13 Unallocated						
TOTAL	16 742	100.0%	19 078	100.0%	21 997	100.0%

Government allocations for higher education for 2009/2010 to 2011/2012 have the following features: as a first step, the total national budget for higher education is divided into two main categories - 'earmarked funding' and 'block grants'.

Earmarked funding may only be used for the purposes for which it was given. Examples are the money allocated for the National Student Financial Aid Scheme (NSFAS), improvement of infrastructure and efficiency, and the establishment of two new institutions. The merging of universities and technikons was also funded at the time of the mergers.

Block grants are funds that the institution may allocate internally at its own discretion after consultation with the council of the institution, and which are generally referred to as a university's 'subsidy'. The five categories of subsidies, each a part of the total block grant, for which institutions may qualify are:

- teaching input grants;
- teaching output grants;
- research output grants;
- institutional factor grants; and
- teaching and research development grants (to be used as earmarked funds).

Table 4 Study field disciplines divided into four groups

Funding group	CESM categories included in funding group
1	07 Education
	13 Law
	14 Librarianship
	20 Psychology
	21 Social Services/Public Administration
2	04 Business/Commerce
	05 Communication
	06 Computer Science
	12 Languages
	18 Philosophy/Religion
	22 Social Sciences
3	02 Architecture/Planning
	08 Engineering
	10 Home Economics
	11 Industrial Arts
	16 Mathematical Sciences
	19 Physical Education
4	01 Agriculture
	03 Fine and Performing Arts
	09 Health Sciences
	15 Life and Physical Sciences

Table 5 Weightings according to funding group and study level

Funding group	Undergraduate and equivalent	Honours and equivalent	Masters and equivalent	Doctoral and equivalent
1	1.0 (0.5)	2.0 (1.0)	3.0 (3.0)	4.0 (4.0)
2	1.5 (0.75)	3.0 (1.5)	4.5 (4.5)	6.0 (6.0)
3	2.5 (1.25)	5.0 (2.5)	7.5 (7.5)	10.0 (10.0)
4	3.5 (1.75)	7.0 (3.5)	10.5 (10.5)	14.0 (14.0)

Teaching input grants are allocated according to the categories approved in terms of the PQM process, and the actual number of enrolments for each academic year. In terms of this, the FTE (full-time equivalent) values of each student's modules will be placed in a 'funding grid' (i.e. a matrix with four subject groups and four levels), defined by the classification of educational subject matter (CESM).

The groups in the funding grid are assumed to generally reflect the costs of teaching different subjects. For example, Group 1 consists of the 'cheapest' subjects (such as law, psychology, and education), and Group 4 the most expensive (including agriculture, medical sciences and performing arts). Tables 4 and 5 show the position of the 22 disciplines in the four funding groups (these 22 disciplines have since 2010 been reduced to 20), and the four levels used in the funding grid (with more funding provided for the higher levels).

Each higher education institution calculates its total number of weighted teaching input units, after which its teaching input grant is calculated as a proportionate share of the funds allocated by the minister to teaching inputs.

Teaching output grants are allocated according to the number of non-research degrees, diplomas or certificates awarded by an institution in a particular year (i.e. degrees up to and including taught masters). Government has set a normative graduation rate, but if an institution does not meet the norm it then qualifies for an earmarked development grant to enable it to improve its output.

Research output grants are allocated according to the number of research masters degrees, doctoral degrees and accredited research publications that an institution produces each year (weighted 1:3:1). Once again, norms have been set, but institutions that do not meet the norm qualify for earmarked development grants.

Institutional grants are divided into two elements. The first allocates additional funds on a sliding scale to small institutions, on the assumption that large institutions have economies of scale and can therefore make do with less. The second allocates additional funds on a sliding scale to institutions that have high percentages of students from disadvantaged groups (in the South African context defined as Coloured and African students).

Development grants are allocated to institutions that do not meet the norms set for teaching and research outputs. The money available in this category is that which is left over from the teaching output and research output categories when institutions do not earn the available totals. The development grants are earmarked funding, and the funds are only released to universities after they have submitted a business plan to the Department of Higher Education and Training (DHET) for the utilisation of the funds.

The amount of money available for each of the four categories of grant is determined annually by the minister. The funding framework is a mechanism for dividing the funds available in each grant category rather than a formula that calculates what is required by the universities.

The legal framework for funding in South Africa

The annual Ministerial Statement on University Funding deals with the funding instruments, and is published in accordance with the requirements of the Higher Education Act (Act 101 of 1997) and the funding framework approved by the minister of higher education and training and the minister of finance. The new funding framework, therefore, gives the minister of education the authority to change the way higher education institutions are funded.

The following incentives are implicit in the South African funding framework:

- Teaching input funding provides an opportunity for higher education institutions to increase the number of students. Input funding which is determined by the weighting of disciplines and level of study encourages the institutions to redesign and re-examine the curricula of the programmes they offer. Developing new programmes which are locally relevant and specifically aimed to address the challenges that the country faces provides a further opportunity to attract students from more diverse backgrounds. The weights in the funding grid are indicative of the incentives placed on postgraduate (and especially doctoral) studies and in the scarce skills fields of study. Teaching input funding therefore also provides a subsidy for enrolled doctorate students. The FTE credit value for an enrolled PhD student is dependent on the time a student takes to graduate, so graduation rates for doctoral students are of extreme importance, providing an incentive for universities to improve their performance in this regard.
- Teaching output funding based on the number of students who complete their studies provides an incentive which is dependent on throughput and graduation rates. This encourages institutions to provide an efficient student support system, to present summer or winter schools for students at risk, to introduce more e-learning opportunities, and to improve the learning material. These incentives apply to all students but are mainly aimed at improving the success rates of disadvantaged students. The allocation of 'teaching development funds' to assist institutions in improving their throughput and graduation rates may be seen as an allocation to improve the quality of teaching at these institutions. Teaching output funding has no explicit impact on the funding of doctoral students, but (implicitly) the graduation rate of postgraduate students feeds into the enrolment of masters and doctoral students.
- A very important component in the block grant is the funding for research output. This component encourages institutions to improve their share of outputs of the higher education system, especially doctoral graduations which carry the greatest weight. Institutions are encouraging and recruiting black students to enrol for postgraduate (and especially doctoral) studies, by offering bursaries and other financial incentives. Disadvantaged students graduating with a masters or doctorate can be recruited for a teaching or research position at the institution, thereby improving the diversity profile of the staff. A 'research development' allocation may be available to increase the number of publications in accredited journals, registered patents, academic books published, and the number of research masters and doctoral graduates.
- The two components of the institutional factor grants are specifically aimed at promoting diversity in higher education. This first component takes the size of the institution into account. The smallest institution (the one with the lowest number of FTE students) receives an additional

amount of 15 per cent of its teaching input grant. Institutions that have more than a specified number of FTE students (determined by the minister) receive no additional funding. This can be seen as redress funding because most of the previously disadvantaged institutions do not have large numbers of students. The second component makes provision for an allocation based on the percentage of black students enrolled at an institution. Institutions with 80 per cent or more black students receive an allocation of 10 per cent of their teaching input grant. Institutions with less than 40 per cent black enrolments receive nothing. The institutional factor grant, therefore, is a very important incentive for promoting racial diversity at all institutions.

In mid-2012, the Financial and Fiscal Commission (FFC) of South Africa initiated a project which focusses on the generic budget and funding framework issues for future financing of higher education. The commission noted that the performance of the higher education system is moving forward but is still not meeting national developmental goals, especially the graduate and research output rates of the system which are well below what is needed and expected. The FFC is also of the opinion that consideration should be given to a differentiated funding framework by introducing a system of three funding frameworks. The three frameworks could address the needs and characteristics of three clusters of higher education institutions based on certain criteria. The criteria could also allow institutions to move either up or down, depending on their performance in knowledge production. The project will investigate the expected outcomes of a pro-education policy that addresses the skills shortages by employing a dynamic education macro-economic model linked to the labour market. The project, in addition to examining the financial and fiscal issues pertinent to the further education and training (FET) sector, will also aim to identify the strengths and weaknesses of the sector as a whole and to suggest ideas for budgetary reforms. The FFC project will be informed by analyses of the relevant elements of the Green Paper on Higher Education, the Ten Year Plan on Innovation, the Ministerial Review on Science and Technology and the National Development Plan. It can be expected that the outcome of the project could have a significant impact on the future funding of the higher education sector, especially with respect to high level graduate and research outputs.

Bursaries and scholarships as a funding mechanism for doctoral education

Although the concept of a student loan scheme has existed in Africa for more than 50 years, the awarding of bursaries and scholarships for doctoral students is not common practice in African countries (IAU 2010).

Many universities in South Africa (especially these with a high research profile) offer bursaries or scholarships from their own funds (first- and second-stream income) for doctoral studies on the basis of merit or on the basis of student need. The value of these bursaries varies substantially between institutions (currently between about R14 000 and R45 000 per annum). These bursaries are usually awarded for a period of three years. Some universities also provide opportunities for doctoral study at foreign universities.

Bursaries and scholarships for doctoral education are also awarded by South African universities from earmarked third-stream funds. These funds originate usually from bequests of alumni and other individuals, as well as from private sector companies with long-standing relationships with the particular university as far as postgraduate teaching and research are concerned. It is usually the historically advantaged universities which have the finances to offer these types of bursaries. The size and conditions of these bursaries vary considerably.

The National Research Foundation (NRF) and the Medical Research Foundation (MRC) offer a range of bursaries and scholarships for doctoral education in South Africa. The NRF and MRC act in this regard as agents for the Department of Science and Technology (DST). Firstly, they offer so-called free-standing PhD bursaries on merit for any applicant, provided that the applicant is already accepted by a South African university for doctoral study. The amount allocated for these free-standing bursaries, linked to different fields of doctoral study, is at present R60 000 per annum for a period of three years. A bursary holder must apply for renewal each year. The number of free-standing NRF bursaries for PhD studies, which is presently just over 2 000, will be increased by the NRF to about 6 000 by 2025. Secondly, bursaries valued at R80 000 per annum are awarded annually for three years, where grant holders are all linked to the NRF's South African Research Chairs initiative (SARCHi). On 29 February 2012 the minister of science and technology made a call to all South African universities to apply for 60 new research chairs. These 60 new chairs will bring the total number of chairs to 151 and will also boost the number of scholarships which will be made available by the NRF for doctoral study in the next few years.

Funding for the development of a new generation of academics

The limited capacity of academic staff in SADC countries to perform high-level research and to efficiently supervise doctoral students is a major obstacle to the increase of doctoral graduates in these countries. A working group was appointed by Higher Education South Africa (HESA) in 2010 to provide proposals for a national programme to develop the next generation of academics for South African higher education.

According to the working group report completed in May 2011:

South African universities face a multi-dimensional crisis in attracting, appointing and retaining academic staff. Academia is not a particularly attractive career option due to relatively low salaries, expanding student numbers and consequent workloads and institutional culture issues (HESA 2011).

The HESA report identified a number of challenges in developing a new generation of academics for South African higher education:

- *Existing inequality of representation*: in 2009, 57.7 per cent of all academic staff was still white, and women were under-represented especially in the higher academic ranks.
- *Current postgraduate pipeline*: the limited output in masters and doctoral graduates constrains the transformation of the social composition of the next generation of academics. In 2009 and 2010, white doctoral graduates still represented respectively 50.5 per cent and 48.3 per cent of all doctoral graduates, while male doctoral graduates only decreased from 58.5 per cent to 58.1 per cent in the same period.
- *Limited supervision expertise*: only about a third of all permanent academic staff at South African universities currently hold PhDs and are thus eligible to supervise at this level.
- *NRF support*: Although NRF support for PhD students increased markedly from 2005 to 2006, this increase was not sustained subsequently.
- *Remuneration*: Academic remuneration is not competitive with public and private sector remuneration.
- *Institutional culture*: black academics tend to find themselves marginalised by many institutional environments and cultures, and by the hegemony in the centres of administrative and academic power (committees, disciplines, departments and faculties) of white academics and administrators.

- *Academic mobility*: a continuing brain drain is taking place, which has its basis in political and social conditions.
- *Age profile of academics*: on the basis of the current retirement age of 65 (at some universities retirement at an earlier age is possible), in less than a decade over 3 000 permanent academic staff will retire and need to be replaced (approximately one-fifth). Of these 32 per cent are professors and 17 per cent are associate professors.
- *Expansion of higher education*: although student enrolment in the 23 higher education institutions in South Africa has on average increased by 3.2 per cent annually between 2003 and 2010, the number of permanently appointed academic staff increased on average by only 1.2 per cent annually. The student-to-lecturer ratio is therefore steadily increasing from year to year.

These challenges clearly show the need for a national initiative to develop a new generation of academics, equipped to do research and to publish. The HESA report indicates that a number of higher education institutions have developed strategies to increase the number of black and women academics. These programmes, which have been in existence for the better part of a decade in some institutions, are funded largely by donors. Sustaining such programmes by means of donor funding alone is not possible in the longer term.

The HESA report proposes a national development plan to generate a new generation of academics with specific aims, objectives and expected outcomes, arguing that:

there has to be a commitment by institutions to appoint (through screening) Next Generation academics upon the successful achievement of agreed goals. This entails an institution, in consultation with academic departments or research entities, making provision for the employment of the Next Generation academic through effective succession planning. It is imperative that Next Generation academics are contracted with the understanding that, if they are successful in realising agreed goals and developing as academics, they will be screened for vacant posts (arising through retirement, resignation) or new posts in their institutions. The future academics should have met the institution's probationary requirements by the time they have completed their contract periods, and should be ready for appointment to a tenured position. Should the Next Generation academics decide to leave the academia or move to another institution during the course of or after completion of the three-year contract, s/he or his/her new employer will be required to reimburse the host-institution for the period employed.

To facilitate their development, it is important to confer on the Next Generation academic the status of an academic. It is also vital that experienced senior academics should be appointed as mentors during the training of the new academics, and to establish structured three-year development plans, with regular joint reporting by the new academic and the mentor on progress. The Next Generation Development Programme should be viewed as a national-level capacity-building project of the Department of Higher Education and Training (DHET). The programme should prioritise the creation of opportunities for, in the first instance, black and female South Africans, with due consideration of individuals from other African countries or from other disadvantaged or under-represented groups. Earmarked funding for Next Generation posts should be made available to institutions that satisfy clear and transparent criteria. These criteria should include demonstrable institutional willingness and capacity to establish and manage high-quality institution-level programmes that provide developmental opportunities for Next Generation academics within their institutions, and the appointment of successful Next Generation academics to permanent posts. Institutions should be required to apply for posts and funding.

An expert reference group should be appointed to support the DHET in scrutinising applications from institutions and making recommendations for awards of Next Generation posts to institutions. There should be annual institutional reporting on the management and implementation of the programme. Continued award of posts and funding should be contingent on institutions complying with specified programme requirements. After three years, there should be a comprehensive national evaluation of the programme.

The HESA report indicates that initiatives at various institutions to develop the next generation of academics have been implemented largely through the support of international donor funding. Such donor funding is neither open-ended nor adequate, nor able to develop sustainable long-term initiatives orientated to a systemic and national effort to produce new academics. It is clear that public funding through the DHET, the DST and the Skills Development Fund (SDF) is required to support higher education institutions in implementing and managing such a programme.

It is proposed in the HESA report that, in the light of pressures on the current higher education budget, funding for the programme should be new funding that is mobilised by the DHET, the DST and the SDF through the National Treasury. The investment proposed in the HESA report (see Table 6) is extremely modest relative to the immense direct and indirect benefits that will be yielded by the programme. The report proposes that, in the event that support from the National Treasury is not immediately forthcoming, the DHET examines its current categories of earmarked funds with a view to supporting the programme in the short term. Funding should be:

- of a dedicated earmarked nature that is available on application by higher education institutions;
- awarded on the basis of higher education institutions meeting criteria specified by the DHET (institutions are to develop criteria for the selection of candidates); and
- available for at least three cycles of three years' duration.

Such funding should provide for:

- Next Generation academic posts of three-years duration, including salaries and benefits;
- costs associated with infrastructure and equipment for Next Generation academics;
- costs associated with development activities for Next Generation academics (such as attendance of courses, workshops and conferences), their mentors, and the emerging community of practice to manage and support these academics; and
- contracting mentors for Next Generation academics.
- Higher education institutions would be required to bear the costs associated with the management of the Next Generation Development Programme.

Table 6 Budget for Next Generation development programme (HESA 2011)

Item	Year 1/R	Year 2/R ¹	Year 3/R ¹
Next Generation academic posts: 300 posts x R350 000	105 000 000	113 400 000	122 472 000
Infrastructure and equipment: 300 posts x R50 000	15 000 000	16 200 000	17 496 000
Development activities: 300 posts x R50 000	15 000 000	16 200 000	17 496 000
Mentors: 300 posts x R30 000	9 000 000	9 720 000	10 497 600
Total per year	144 000 000	155 520 000	167 961 600
Total for 3-year cycle			467 481 600

1. Provision is made for an annual escalation of 8 per cent

Although the HESA working group funding proposal indicated in Table 6 has merit, more emphasis should be placed on the completion of a doctoral degree within the three-year cycle (or as soon as possible thereafter). In order to meet this target, preference should be given during the institutional screening process to candidates with high academic merit who have already completed a masters degree.

In the *Green Paper for Post-School Education and Training* (DHET 2012) the DHET foresees that a medium- to long-term plan for renewing the academic profession must be developed. In this plan provision will be made for addressing staffing shortages at universities, upgrading academics into masters and doctoral programmes locally and abroad, upgrading the teaching qualifications, and improving the overall quality of academics. The Green Paper states that increased investment in research and development is necessary, especially in science, engineering and technology (SET), and that in order to ensure a continuous supply of academics who are active researchers the DHET will provide a pool of sufficient funds for higher education institutions.

Funding doctoral education by means of strategic collaboration

Collaboration between higher education institutions, especially in research (including doctoral education), is beneficial to all collaborating institutions. Some of the benefits for an institution are:

- enhancing quality in instruction and research;
- building capacity of academic staff in research and doctoral supervision;
- widening the international horizon of the institution, its staff and students;
- building institutional networks; and
- making it easier to secure funding for collaborative projects to be shared between partners.

A document summarising the outcomes from the Global Strategic Forum on Doctoral Education in Denmark in 2011 (EUA-CDE 2011) emphasises the following points:

The global research community thrives by recognising diversity. It is necessary to emphasise and promote the multi-polar nature of the community by securing broad access to knowledge globally as well as disseminating local knowledge and local paradigms of thinking, which could challenge academic hegemonies. [...]

Mobility schemes and collaborations between institutions should explicitly take capacity-building into account in order to mutually increase the excellence of all partners; they should include mechanisms that facilitate the return of scholars to their home country. [...]

Dialogue with and the support of a wide range of stakeholders is central to developing doctoral education which can make a significant impact on society, including an understanding of the importance of developing local knowledge while also cultivating an international research environment. [...]

The report of a workshop in September 2011 on global trends in strategic collaboration and doctoral education (CODOC 2011) indicates that:

The initial results confirm that universities in all three regions see doctoral education as an increasingly important part of their internationalisation strategies. However, it was also clear that, currently, collaborations with 'Northern' regions such as Europe and the United

States were by far the most common and that collaboration[s] within and particularly between 'southern' regions were much less well developed.

Collaboration between African countries, and especially between universities in SADC countries, has only a very recent history. This issue was discussed in a recent paper (Kotecha et al.: 2011) entitled *Deepening Research Capacity and Collaboration across Universities in SADC: a Southern African Universities Regional Research and Development Fund*. The paper makes recommendations regarding the establishment of a university research and development (R&D) fund to support collaborative projects in the region, to enhance research in the region, and to increase the PhD graduation rate.

Two examples of collaboration initiatives between institutions to promote masters and doctoral education are PANGeA and the introduction of joint or double degrees.

The Partnership for Africa's Next Generation of Academics (PANGeA)

In view of the challenges facing higher education in Africa in general, and the humanities and social sciences in particular, the conviction is growing amongst scholars in Africa that Africans must strengthen their role in determining the ways in which problems of development and underdevelopment on the continent will be addressed. The Partnership for Africa's Next Generation of Academics (PANGeA) originated in a meeting of deans of humanities and social science faculties in Stellenbosch in November 2006. PANGeA started as a collaborative network to develop research capacity and confidence in bringing Africa's expertise to Africa's problems. A formal memorandum of understanding was signed in November 2010.

Stellenbosch University's HOPE Project allocated seed funding to the Faculty of Arts and Social Sciences for a 'flagship project', the Graduate School, which incorporates the African Doctoral Academy. The Graduate School focuses on selected multi- and inter-disciplinary research themes to prepare Africa's next generation of academics and professionals to address critical challenges on the African continent. The Graduate School will focus on the role of the arts and social sciences in the promotion of peace and the eradication of poverty in Africa by addressing a number of research themes. One of the main aims of the Graduate School is to attract outstanding postgraduate students from South Africa and participating African universities. The founding members are the Universities of Botswana, Dar es Salaam, Makerere, Malawi, Nairobi and Stellenbosch. A public lecture and seminar series (LSS) is organised by the Graduate School to provide doctoral students with the theoretical basis for advanced studies focused on the development of intellectual life in Africa. The LSS showcases leading thinkers from the continent as well as the diaspora in public lectures or panel discussions, followed by in-depth seminars with staff and students on the lecture topics.

Awarding joint and double degrees at masters and doctoral level

A number of South African universities are presently adjusting their academic policies to enable and facilitate agreements with foreign universities to offer joint or double masters and doctoral degrees. A joint degree involves international academic collaboration between two or more institutions on a jointly defined and entirely shared study. All partner institutions are responsible for the entire programme, and not just for their own separate parts. A double degree results from international academic collaboration between two or more institutions on a jointly defined but only partially shared study programme, with some areas being specific to each of the partners while other areas are shared. Partner institutions are responsible for their own separate parts

(the parts are mutually recognised by the partners), but have a shared responsibility in respect of those parts of the programme which are shared.

The outcomes of both joint and double degrees are single qualifications. The fundamental difference lies in the shared nature of the jointly defined study programme, which indicates the depth of the collaboration. Joint degrees lie at one end of a continuum, indicating the highest level of collaboration, and double degrees at a further point on the continuum. At the other extreme is credit recognition or information co-operation. As a rule, joint degrees are normally more applicable to research degree programmes (PhDs and research masters). The resultant certificate is generally dictated by the national and legal requirements in each country. The joint funding of the academic collaboration between universities can be problematic and should form part of the agreement between the universities.

Stellenbosch University has already entered into eight agreements with universities in Europe to offer joint or double doctoral degrees. Agreements between Stellenbosch and other universities in Africa are in the pipeline through initiatives such as PANGeA. Other South African universities are also in the process of entering into agreements with foreign universities to offer joint or double masters and doctoral degrees.

The SADC Protocol on Education requires all member countries to treat students from other member countries as local students for the purpose of study and residence fees. This facilitates collaboration between SADC countries in doctoral education since no additional or separate administration of students from the other SADC country is necessary (as is usually the case with foreign postgraduate students, who typically pay higher study fees than local students).

According to the *Green Paper for Post-School Education and Training* (DHET 2012):

The establishment of the Southern African Regional Universities Association (SARUA) is starting to play an important role in promoting university linkages in the SADC region, and this has the potential to play an important developmental role in our region. The strengthening of all of these links is important. The state, through both the DHET and the NRF, should assist the development of collaborative intellectual and research networks, especially within the SADC region. The regular meetings of SADC Ministers of Education are another important forum for promoting co-operation between the universities – and indeed colleges – in Southern Africa.

The time is right for SARUA to move forward with definite proposals for the funding of strategic collaboration in doctoral education within SADC countries. In these proposals preference should be given to the instituting of joint and double doctoral degrees. It is important that the respective higher education departments in all SADC countries should jointly develop a policy framework to facilitate this form of collaboration. This policy framework should address both the academic aspects and the funding aspects of such collaborations.

SADC regional research and development (R&D) fund

The SARUA research report (Kotecha et al.: 2011) describes the critical issues facing SADC universities, and particularly the research and development capacity and productivity of these institutions. The establishment of a SADC university R&D fund is proposed as a partial but influential solution to these problems. According to the report, the objectives of such a fund would be to:

- strengthen the research capacity of universities within the Southern African region,
- strengthen the networks between researchers from the universities within this region (notably South-South partnerships), particularly between countries which have historically not collaborated despite many good reasons for doing so,
- increase the research output of these universities in areas of direct and specific relevance to the region including health, infrastructure, social sciences, mining, financial services and manufacturing,
- increase the output of postgraduates from the region's universities who are well equipped to undertake the development of innovative products and services to meet the needs of the region.

The report outlines the scope and operation of the proposed R&D fund, the feasibility of the fund, specific considerations for participating universities, and a proposed implementation and monitoring strategy. The fund would initially consist of a portfolio of about fifteen projects, funded over a three- to five-year period. The total value of the fund is estimated at \$100 million over the first five years of the initiative. This money would be sourced from interested donors and participating countries. However, for the long-term viability and sustainability of the fund, it is important to ensure that all SADC governments contribute to its funding on an annual basis. Each project would be funded initially for a one-year period, during which time a proof of principle would need to be well established; the project would then be eligible for funding over a further three-year period, after which time clear deliverables and outputs would be required, including:

- peer-reviewed publications;
- provisional patents (where applicable);
- PhD graduates;
- joint authorship of publications;
- success in raising additional funds for collaborative research projects; and
- leading author status on the project's publications by at least one of the participating institutions.

The initial proposed focus areas (SET domains) for the fund are:

- information and communications technology (ICT);
- climate change;
- health;
- human and social dynamics;
- energy security; and
- food security.

An administration and management structure for the fund would be necessary. The cost of this structure is estimated to be between 4 and 8 per cent of the annual fund disbursements.

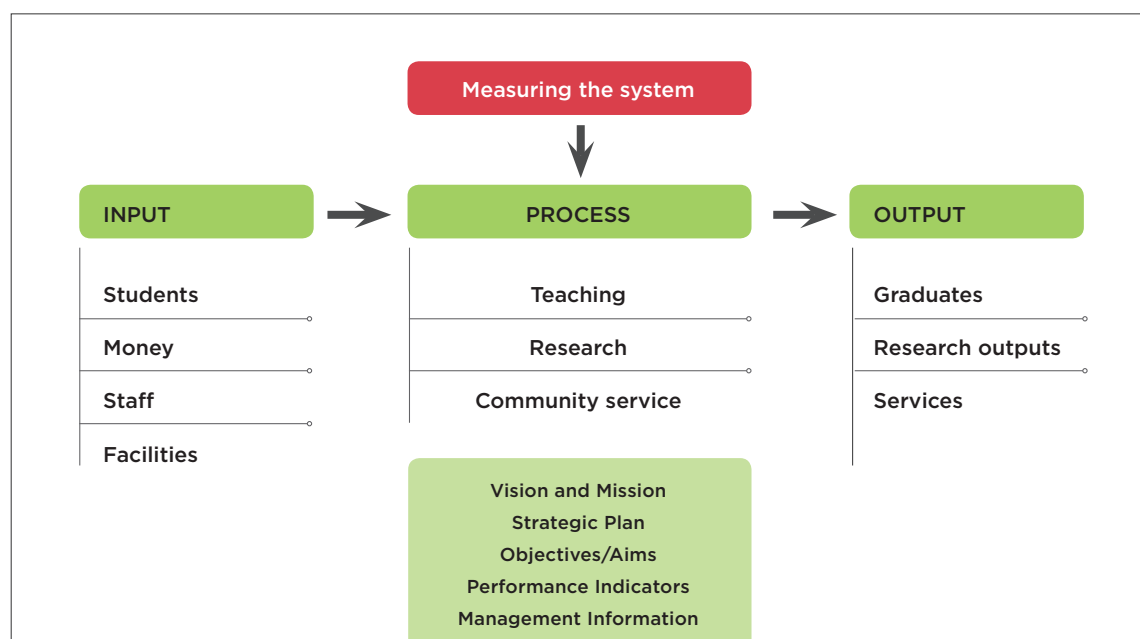
It is clear that once this fund is operational it could be an important vehicle for the collaboration and funding of doctoral education in SADC countries, and for the development of a new generation of academics who are not only doctoral graduates but also well-known researchers capable of fulfilling the role of supervisors for doctoral students.

The future funding of doctoral education in SADC countries

The role of a higher education management information system

In performing their management obligations towards higher education, the executive and senior managers of a national education authority (e.g. the Department of Education) and the higher education institution need to know what the trends of certain indicators are. These indicators usually measure the performance of the internal processes of an institution. The efficiency of the internal processes depends to a large extent on the inputs to the system (students, staff, money and facilities), and the quality of the outputs (graduates, research output, and services rendered) is dependent on the efficiency of the internal processes. Figure 1 illustrates an input-process-output approach applicable to higher education institutions.

Figure 1: A systems approach applicable to higher education institutions



Source: Vermeulen (2011)

The important inputs which directly impact on the management of an institution are mainly the students and staff, although the funding of an institution is paramount in order to ensure an efficient and sustainable enterprise. The performance of the system should be measured against the vision and mission of the institution and its strategic plan. The strategic plan usually contains objectives linked to the strategic thrusts that the institution is committed to pursuing. To evaluate the performance of an institution, the executive and senior managers need access to a comprehensive institutional management information system (MIS). The MIS should contain performance indicators that will enable the executive and senior managers to evaluate and analyse the progress made towards the goals set for the objectives in the strategic plan. The importance of an MIS should therefore be recognised because one needs to measure to be able to manage.

Management information should be viewed according to the purpose for which the information is to be used (Vermeulen 2011), and can be categorised into different levels. Information on the *macro level* provides insight into the exogenous variables that may impact on an institution, but over which the institution has no control (e.g. the current state of the economy and projections for the future, population forecasts, the future prospects of the schooling system, etc.). The next level is categorised as *meso level 1*, which should provide institutional information to the executive

and senior management of an institution on an aggregate level to enable them to meet their reporting responsibility to council. It is at this level that performance indicators play a major role. The information contained in *meso level 2* is aimed at supporting the deans to manage their faculties effectively. It is their obligation to report to the member of the executive responsible for the different portfolios of teaching and learning, research and community engagement on the progress made towards the faculty goals which should be aligned to the institution's objectives in the strategic plan. The deans are responsible for their faculty's performance against the agreed goals. The last level is the *micro level*, where information on a more operational level is provided. This will include data and information at the departmental or discipline level (for example, study programmes, course enrolments, cost of courses, income statements of departments, staff and operational expenses).

It is absolutely essential for any country to have a national higher education management information system which enables government to efficiently plan, monitor and fund the system. The same national MIS can be used by individual institutions for the same purpose.

The Higher Education Management Information System (HEMIS) used in South Africa since 1999 is based on the South African post-secondary Education (SAPSE) information system which was implemented 30 years ago. These two information systems have played a vital role in policy development and the monitoring of higher education in South Africa. They have enabled the South African government to fund higher education institutions by means of sophisticated subsidy formulas (as outlined earlier in this paper). The detailed information included in the HEMIS and SAPSE systems made it possible, for example, for the higher education authorities in South Africa to incentivise and enhance research output (including doctoral output) by means of funding formulas.

Benefits of government funding by means of a formula

A government subsidy policy based on a well-defined and transparent formula has several advantages. According to Steyn & de Villiers (2006) these include:

- ensuring that funding takes place in a fair and objective way, which depoliticises the allocation of funds to a large extent;
- providing a contract between the state (represented by the minister responsible for higher education) and a higher education institution – the state provides funds to institutions for specific educational purposes, while the institution renders these educational services to the public;
- giving greater recognition to the autonomy of an institution, since the state (except in the case of earmarked amounts) does not prescribe how the allocated amount has to be spent, which differs markedly from item-based budgeting with extensive earmarking of amounts; and
- ensuring that the rules of the funding methodology are known in advance, thereby promoting medium and long-term planning by both government and institutions.

Subsidy formulas are designed to be flexible in order to accommodate as many fluctuating factors (input parameters) as possible. Cost escalation is an example of such a factor and needs to be incorporated into any subsidy formula. However, since a subsidy formula cannot discount all factors (which may be institution-specific), it is only an approximation and represents a funding model for the average institution.

A disadvantage of any formula-based funding mechanism is that the clients served by the formula will inevitably start to exploit the formula by finding loopholes in its composition or in the definition or calculation of the input parameters. It is therefore crucial for the state to deem

any subsidy formula as dynamic, and while it will be counter-productive to revise the formula annually, it should at least be scrutinised carefully every five years with a view to a possible revision. A case in point is that in 2011, eight years after the current funding framework for higher education in South Africa was implemented in 2004, the minister of higher education and training appointed a ministerial committee to review the framework. The committee's report is expected by the end of 2012.

Criteria and incentives for the funding of doctoral education in SADC

As indicated previously, it is very difficult to determine (and therefore to monitor) the actual expenditure of SADC universities on doctoral education. There is, however, a great need to enhance this expenditure in order to significantly increase the quantity and improve the quality of doctoral degrees in SADC countries. Incentivised funding of doctoral education seems to be the best way to ensure increased expenditure of universities on doctoral education.

Based on an analysis of present funding mechanisms which restrict and influence doctoral education in SADC countries, and an analysis of the status quo of doctoral education in the region, the following options are suggested for incentivised funding of doctoral education in the SADC countries:

- government formula funding incentives;
- incentives for focused research;
- bursary incentives for doctoral students;
- incentives for academic staff to obtain a doctorate; and
- incentives for better co-operation between universities.

Government formula funding incentives

The funding formula currently used in South Africa puts a very high premium on the allocation of subsidy as a result of PhD enrolments and PhD degrees awarded. Doctoral degrees awarded are weighted very highly in both the teaching input component and the research output component of the formula. Referring especially to the research output component, it is important to note that according to the *Green Paper for Post-School Education and Training*:

There are questions about the adequacy of the instruments within the funding framework to promote inter-institutional equity. It appears that the funding mechanism currently in place may serve to entrench and even accentuate inequalities between previously advantaged and previously disadvantaged institutions. Because of the high unit value per research output, the funding framework is biased towards rewarding research outputs at the expense of teaching. This has resulted in a very high increase of research output by advantaged institutions that have the means and capacity to 'chase' research. (DHET 2012: 46)

The funding framework for universities in South Africa is currently under review and in the light of the above extract from the Green Paper it would be no surprise if the research output component, including the high reward for awarded PhD degrees in the formula, is scaled down. Even so, it cannot be denied that the introduction of research output as an incentivised driver in the former SAPSE subsidy formula and the current funding formula led to a marked increase in research output in South Africa.

Another way to incentivise doctoral education at universities by way of formula funding would be to include the percentage of permanent academic staff with a doctoral qualification as a

driver in the formula. Clearly this would enhance the drive to renew the academic profession. As far as South Africa is concerned it was already indicated that the Green Paper states that provision will be made for addressing staffing shortages at universities, engaging academics in masters and doctoral programmes locally and abroad, upgrading teaching qualifications, and improving the overall quality of academics.

Incentives for focused research

In most countries the government funding of research is a joint venture between the higher education authorities and the science and technology authorities. In the case of South Africa the Green Paper formulates this as follows:

There is a need to ensure greater coherence in an overall policy framework that governs such research and innovation activities, recognising that the prime source of funding for these activities is the DST. However, the core funding for the operation of universities and determination of the mission and strategic direction of the higher education system resides with the DHET. The strategy of establishing differentiation in the university sector must take into account the need for high-end scientific research in our system without losing sight of the priority objective of ensuring that all universities have the means to meet the expectations for quality teaching and research, according to its agreed-upon outputs. (DHET 2012:44)

In South Africa scholarships for doctoral studies are awarded annually as part of and linked to specific chairs in the South African Research Chair initiative (SARCHi). These chairs are funded by the DST through the NRF for focused research within broad themes which are of high priority to the country. Investment in research (and in particular the research chairs) is intended to improve South Africa's international research and innovation competitiveness while responding to the social and economic challenges of the country. The establishment of 60 new chairs by the minister of science and technology will increase the total number of SARCHi chairs in South Africa to 151. Each chair receives at present R2.5 million per annum from the NRF.

The past few years have shown that the SARCHi chairs and the attached doctoral scholarships made a huge impact in the research profile of South Africa. They also serve as an important vehicle for the enhancement of doctoral education by means of earmarked funding. Incentives like this are very powerful, not only in promoting national research and innovation, but also in creating opportunities for both academic staff and doctoral students at universities.

Bursary incentives for doctoral students

Graduation rates (the ratio of the number of degrees awarded to the number of enrolments in a particular year) for doctoral study are low, even at universities regarded as high-profile research universities. There are many reasons for this. One very important reason is that doctoral study is usually undertaken on a part-time basis. It is difficult to stay focused in PhD studies while paying study fees from year to year with each new registration, even for a student with a good academic record. Full-time doctoral study should be the ideal for all students. Full-time study is more cost-effective than part-time study for the university from a resourcing point of view. However many students, especially previously disadvantaged students, are frequently under family pressure to earn in the job market, and under pressure to raise the necessary funding to continue their academic careers to PhD level.

Although student loans could provide temporary relief for some doctoral students (assuming they can secure loans), the best (and usually the only) solution for full-time PhD study is to become the recipient of a bursary. In South Africa the NRF annually awards free-standing doctoral bursaries

on merit for a three-year term. Many universities, especially those with comprehensive doctoral programmes, also provide bursaries from their own funds. Although the private sector makes bursaries available for doctoral studies, information on the extent of this and the size of the bursaries is not readily available.

Incentives for academic staff to obtain a doctoral degree

Academic staff with a masters degree frequently face the choice between obtaining a PhD to become a good researcher and permanent academic, or taking up a position in the public or the private sector. Many of them decide against PhD study and leave academia, usually because of the higher salaries offered in the public and private sectors, and the perception of better future opportunities. Without the necessary financial incentives, some of the best young brains are flowing out of the academic profession each year. Financial incentives to retain academics will differ from university to university and will mostly depend on each university's capacity to increase and utilise additional third-stream income for this purpose.

The funding of a plan to develop a new generation of academics in SADC countries along the lines indicated in the HESA research report (HESA 2011) will be an important incentive for both universities and young prospective academics committed to obtaining PhD degrees and becoming good researchers.

Incentives for better co-operation between universities

This paper has highlighted the advantages of strategic co-operation between universities in the Southern African region, giving examples of co-operation between institutions and enabling structures to enhance this co-operation. The time is right for SARUA to move forward with definite proposals for the funding of strategic collaboration in doctoral education within and between SADC countries. In these proposals preference should be given to the instituting of joint and double doctoral degrees between two or more universities. It is important that the respective higher education authorities in all SADC countries should jointly develop a policy framework to facilitate this form of collaboration, addressing both the academic aspects and the funding aspects of such collaborations.

Different government funding mechanisms for higher education (including doctoral education) are used in the different SADC countries, and it will not be easy to devise a joint funding mechanism to facilitate institutional collaboration by means of offering joint and double degrees. This is an area for further research by SARUA.

The establishment of a SADC research and development (R&D) fund could provide an important vehicle for the collaboration and funding of doctoral education in Southern Africa. The resourcing of such a fund, as well as the establishment of the proposed administration and management structures, would take some time. The more funds available in the R&D fund, the higher the incentive would be for institutional co-operation.

Recommendations

Government incentives for increased doctoral education are functioning well in the case of South Africa. These should be enhanced in South Africa and extended to other SADC countries.

The HESA proposals dealing with the development of a new generation of academics are specific to South Africa, but could also be implemented in other SADC countries. Collaboration between

SADC countries in this regard should be investigated further, with a view to implementing this initiative as soon as possible throughout the region.

Regarding incentives for broadening the collaboration in doctoral education between universities in the SADC countries, further research is needed. The groundwork for academic collaboration (e.g. joint and double masters and doctoral education) has already been done by some South African universities. The funding of academic collaboration in doctoral education should be investigated further.

Although not discussed in detail in this paper, the enhancement of doctoral education, both as far as the number of graduates and the quality of the academic programmes are concerned, is dependent on the characteristics of the pipeline of potential doctoral students. This pipeline involves the school system, and especially the quality of the teaching of science and mathematics in schools, as well as the quality of teaching at universities on all levels leading up to doctoral study. Large injections of funds will be needed to streamline and widen this pipeline. This important point has frequently been made in South Africa, and is one of the recommendations in the 2010 Academy of Science of South Africa (ASSAF) study. The principle applies to all the SADC countries.

The importance of a well-functioning national higher education management information system cannot be over-emphasised. Although the HEMIS reporting system used in South Africa has some shortcomings, it is a powerful instrument for the planning, monitoring, and funding of higher education in South Africa, and assists in quantifying the universities' income from government sources relating to doctoral education. The income and expenditure information on 20 institutions from ten SADC countries, currently available in the SARUA database, is too incomplete to be analysed and included in this paper. SARUA's research on various matters concerning higher education in the region would be significantly enhanced with the implementation of national higher education management information systems in all the SADC countries. The development of such systems is therefore strongly recommended.

The benefits of a national funding formula for higher education are clear, and it is recommended that all SADC countries consider implementing formula-funding as part of their national policies for higher education.

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