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International rankings: What can we learn from them?

Increasingly the ranking of universities is used by the public in order to assess the quality of higher education institutions, often without an understanding of the criteria and limitations of each ranking system. This *BrieflySpeaking* explores the different criteria of four international ranking systems in order to try and understand what these systems say about South African institutions.

Introduction

University rankings make news headlines, and there is much debate surrounding them. While some institutions invest money and effort into being ranked and focus on improving their position in the rankings, others highlight the rankings' various limitations and question their value. Some of the main criticisms relate to the focus of the rankings on research strength (rather than teaching and learning) and to the need to take country-specific context and priorities into consideration.

In February 2018, the Academy of Science of South Africa (ASSAf) held a roundtable discussion on university rankings.[i] While opinions varied, it was generally agreed that universities should differ in their missions (and that rankings don't take this into account); that rankings ignore context and inequality in the system; and that focusing on being ranked in the Top 100 is not necessarily beneficial to the broader higher education system. The discussion considered the multitude of ranking systems (both global and country-specific), all with slightly different methodologies and foci, which makes comparison between rankings unreliable. The roundtable identified the four ranking systems most often referred to as: Times Higher Education, Academic Ranking of World Universities (formerly Shanghai Jiao Tong Rankings), Quacquarelli Symonds, and the University Ranking by Academic Performance. The discussion concluded that despite methodological concerns, universities, students, parents and funders track rankings, making them an 'an unavoidable reality' which may influence decision-making and spending.[ii]

This *BrieflySpeaking* does not focus on the debates about rankings or the associated challenges. Rather, it explores the four ranking systems mentioned above and unpacks what we can learn about South African institutions from them. Changes in the ranking order of institutions will also be considered, as will specific fields and subjects where South African institutions perform particularly well.

Methodologies

In order to understand what the various ranking systems are measuring, and what they value, their different methodologies and criteria need to be understood. Knowledge of the criteria for each ranking system also highlights the difficulty of comparing them holistically, hence we focus only on those criteria which are of importance in our context. Below is an outline of each system's criteria.

Quacquarelli Symonds (QS) methodology

The QS World University Rankings are calculated using six criteria.[iii] These have remained the same since 2015, allowing for year-on-year comparisons. The 2015

changes made adjustments for faculty specialisations so that the sciences were not unfairly advantaged. The QS allocates a score of 100 to the top performing institution in each criterion. Other institutions are given a comparative score, down to 1. Where an institution scores below the determined minimum threshold, no score is shown.

Academic reputation (40%): has the highest weighting, and is based on an annual survey of over 80 000 academics. The survey covers both teaching and research quality. In order to expand the sample, QS combines responses from the last five years, but excludes repeat respondents, keeping only their most recent scores. Academics are only asked to respond in their field of expertise. In the latest survey, 83 877 academics participated, with respondents from 32 different countries and 0.8% of these came from South Africa. Academics at different post levels responded, with 50% at the level of Professor or Associate Professor. Participation by subject field is also shown on the website The QS analysts scrutinised and gave weightings to responses to reduce bias.[iv]

Employer reputation (10%): is also based on a survey (of about 40 000 employers). Employers are asked to identify 'institutions from which they source the most competent, innovative, effective graduates'. Employers can take the survey online, and responses from the last five years are combined, scrutinised and weighted to reduce bias. In the 2018/19 survey, 42 862 employers participated, with 1.2% of them coming from South Africa. Regarding employers by role and by industry, the largest proportion of respondents were at the Manager/ Executive level (21%) and from Technology companies (9.8%).[v]

Faculty/Student ratio (20%): is used by QS as a proxy for teaching quality. It is interpreted as an indicator of how easily students can access academic staff and tutors, and of the teaching burden on academics.

Citations per faculty (20%): is used as a proxy for research quality. It is calculated by dividing total citations for all papers produced by an institution (over a five year period, but cited over a six year period) by the number of academic staff, normalised for the different publishing cultures of different disciplines. Citation data are sourced from Elsevier's Scopus database. The addition of the Scopus index to the accredited journal lists used by the Department of Higher Education and Training (DHET) in the research output funding process counts in the favour of South African institutions as academics now focus on these journals when selecting where to publish. Scopus is also used by the Times Higher Education ranking system.

International faculty ratio & international student ratio (5% each): are used as proxies for international reputation and in recognition of the advantages (for both staff and students) of being part of a multinational university.

The QS relies heavily (50%) on their two surveys of an institution's reputation. While these are subjective measures, they can be useful in determining how institutions in a specific country are perceived at a specific juncture. Within the remaining 50%, an equal amount (20% each) is allocated to research (measured by citations) and teaching (measured as faculty-student ratio), which makes it stand out from other more research-focused ranking systems. However, this is not a really a reliable indicator of the quality of teaching and learning.[vi] Finally, a small portion (10%) is allocated to internationalisation.

Times Higher Education (THE) methodology

The THE ranking is calculated based on five broad criteria, each with sub-categories.[vii] The methodology on the website is referred to as that for 2018, suggesting possible changes from previous years.[viii] THE also uses an annual survey, but limits respondents to those issued with an invitation, all of whom are academics with publications in Scopus-indexed journals (listed as the author for correspondence).[ix] For the 2018 ranking, THE used a survey of 10 565 academics completed between January and March 2017, as well as the 2016 survey.[x] Responses were statistically representative in terms of geography and subject mix.

Teaching and learning environment (30%): calculated by adding together the institution's reputation (assessed by survey, 15%); the faculty-student ratio (4.5%); the Doctorate to Bachelor's ratio (2.25%); the

number of doctorates awarded to academic staff ratio (6%); and institutional income (which is used as an indicator of infrastructure and teaching facilities; 2.25%).

Research (30%): is based on a survey of reputation (18%); research income (6%); and research productivity (6%). Income is assessed against staff numbers, and adjusted for purchasing power and academic field. Research productivity is measured by the number of publications in journals indexed by Elsevier's Scopus, adjusted for academic field.

Citations (30%): is interpreted as the influence of the institution's research and is based on analysis by Elsevier.

Industry income or knowledge transfer (2.5%): measures the relationship with industry through assessing research income from industry.

International outlook (7.5%): considers the international to domestic student ratio (2.5%); international to domestic staff ratio (2.5%) and international research collaboration (2.5%).

These criteria highlight THE's research focus, with this counting for 60% of the total score. While the teaching and learning environment is allocated 30%, half of this is calculated by survey. The amount allocated to knowledge transfer, a priority for South Africa given our developing economy, is small.

Academic Ranking of World Universities (ARWU, formerly Shanghai Jiao Tong Rankings)

The ARWU uses six ('stable' and 'objective') indicators to rank universities.[xi] Over 1 300 universities are ranked, with the Top 800 published. Universities are assessed if they have any Nobel Laureates, Field Medallists, highly cited researchers, or papers published in Nature or Science. In addition, those with a high number of papers in the Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI) are also included. These Web of Science indices are also used by the South African DHET as accredited journal lists in the research outputs assessment process.

The highest scoring institution in each specific criterion is allocated a score of 100, and other scores are calculated as a percentage of that. Standard statistical techniques are used to adjust indicators if necessary.

Quality of education (10%): is based on the number of alumni winning Nobel Prizes and Field Medals, weighted by period.

Quality of faculty (40%): is based on the number of staff winning Nobel Prizes and Field Medals in specified fields (20%; Award) and highly cited researchers in 21 broad subject categories as determined by Clarivate Analytics (20%: HiCi).

Research output (40%): is calculated based on the number of papers published in Nature and Science, taking author order into account (20%; N&S) and on the number of articles published in the two citation indices mentioned above (PUB; 20%). For institutions focusing on the humanities and social sciences, the N&S criterion is dropped and other criteria increase in value.

Per capita performance (10%): is calculated using weighted scores of the five criteria, divided by the number of full-time equivalent (FTE) academic staff, or just the weighted score if the number of FTE staff is not available (PCP).

The ARWU ranking system is more research-focused than either the QS or THE. The proxy for 'quality of education' also leans towards research rather than teaching, and only considers a few top alumni rather than the overall quality of teaching and learning. This ranking is science focused.

University Rankings by Academic Performance (URAP)

URAP is a non-profit organisation established at the Informatics Institute of the Middle East Technical University in 2009.[xii] URAP describes its ranking system as focused on 'academic performance indicators', of all which are research focused.[xiii] The most recent ranking included 2 500 universities and 41 subject fields, after collecting data for 3 000 institutions. URAP includes more institutions than the other rankings – about 12% of institutions worldwide. URAP uses bibliometric data

from the Web of Science and InCites and makes subject adjustments to account for publication trends in different fields.

Number of articles (21%): is a measure of productivity based on the number of articles published in journals that are listed within the first, second and third quartiles in terms of their Journal Impact Factor. Articles with more than 1 000 authors are excluded.

Citations (21%): is a measure of research impact based on citations received (between 2012 and 2016) in journals selected as for criterion 1.

Total document (10%): measures sustainability and continuity of scientific productivity by counting all scholarly output (including conference papers, reviews, letters etc.) published between 2012 and 2016. The total document counts are not subjected to filtering.

Journal article impact total (18%): measures scientific productivity and is corrected by the institution's normalised citation per publication (CPP) with respect to the world CPP in 23 subject areas. The ratio of the institution's CPP and the world CPP indicates whether the institution is performing above or below the world average in that field. This ratio is multiplied by the number of publications in that field and then summed across the 23 fields.

Journal citation impact total (15%): is a measure of research impact, corrected as above. This ratio is multiplied by the number of citations in that field and then summed across the 23 fields.

International collaboration (15%): is based on the total number of articles (2012 to 2016) published in collaboration with foreign universities, measured through InCites.

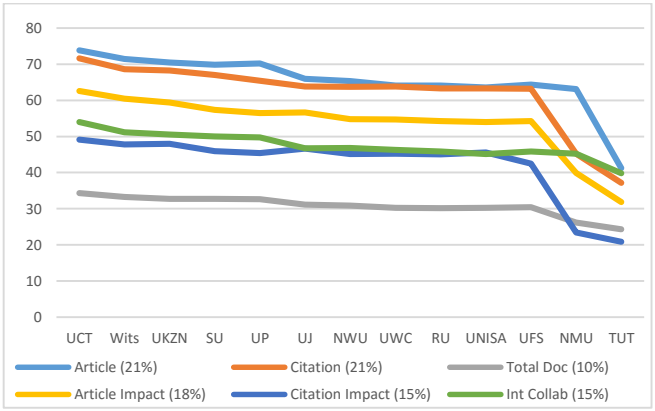
This ranking system includes 18 South African institutions, more than any other system. Considering their coverage of 12% of universities worldwide, this means that 18 of our 26 universities are in the top 12% internationally in terms of these research-focused criteria.

World University ranking

Having outlined the various criteria, it is useful to see how South African universities performed in the latest rankings and in specific criteria.

In the 2017-2018 **URAP ranking**, 18 South African, (and 108 African) institutions were ranked.[xiv] Ten South African universities formed part of the Top 20 African universities, with UCT, Wits, UKZN and Cairo University constituting the Top 4. UCT was the only one to receive an A+ rating. Harvard University was ranked as the top institution worldwide, with a score of 600 and an A++ ranking. In total, 108 institutions (all with scores over 380) were ranked as A++. The performance of South African institutions is shown in Table 1, which is represented graphically in Figure 1.

Figure 1: Representation of 2017-2018 URAP World Ranking for South African institutions



As already indicated, this ranking system is research focused. Looking at the various scores, South African institutions perform well in terms of number of articles (12 institutions with 60 or above) and citations (11 institutions with 60 or above). However, for most institutions, the lowest score is the one for 'Total document' (grey in the graph above) – a measure of sustainability and continuity of scientific production – suggesting signs that South African institutions may not be able to sustain this high level of research output given the number of academic staff. This is of concern given the current debates around the sustainability of funding (and possible cuts to research funding in favour of funding for student fees) and around the need to develop a cohort of younger researchers and academics.

In terms of collaboration, most institutions scored in the 40s and 50s, suggesting some international collaboration. This is an area where the DHET's research output assessment policy may be acting as a disincentive given that when calculating research output units, authors who have collaborated on an article are only given a fraction of a unit, depending on the number of authors. This is also the case when collaborating authors are not from a South African institution.

Table 1: 2017-2018 URAP World Ranking

University	World Rank	Category	Article (21%)	Citation (21%)	Total Doc (10%)	Article Impact (18%)	Citation Impact (15%)	Int Collab (15%)	Total
UCT	229	A+	73.82	71.62	34.30	62.57	49.09	54.01	345.40
Wits	317	A	71.45	68.63	33.24	60.50	47.80	51.20	332.82
UKZN	349	A	70.53	68.28	32.73	59.38	47.95	50.55	329.42
SU	421	A	69.86	67.06	32.71	57.34	45.92	50.04	322.94
UP	459	A	70.25	65.43	32.63	56.49	45.44	49.76	320.00
UJ	655	B++	66.01	63.82	31.16	56.69	46.67	46.76	311.12
NWU	808	B++	65.36	63.77	30.89	54.78	45.13	46.81	306.74
UWC	919	B++	64.07	63.80	30.28	54.67	45.26	46.26	304.33
RU	997	B++	64.09	63.32	30.17	54.28	45.03	45.89	302.78
UNISA	1051	B+	63.55	63.31	30.23	54.03	45.54	45.15	301.81
UFS	1094	B+	64.37	63.23	30.38	54.25	42.44	45.83	300.52
NMU	1402	B+	63.15	45.26	26.18	39.91	23.44	45.21	243.14
TUT	1587	B	41.24	37.18	24.29	31.80	20.87	39.83	195.21
DUT	2069	B	19.92	17.40	6.58	13.58	15.91	18.06	91.44
UL	2073	B	14.80	16.89	11.59	13.45	8.72	25.05	90.49
CPUT	2100	B	19.06	16.32	10.26	13.69	11.43	15.24	85.99
UFH	2273	B-	15.93	11.49	10.10	9.19	4.12	12.30	63.14
UV	2446	B-	5.70	8.28	4.74	5.72	3.54	14.00	41.97

The **2018 ARWU ranking** included four South African institutions, compared to eight in 2017. When considering the score per criterion, it is evident that most South African institutions are negatively affected by the focus of this ranking on winners (alumni and faculty) of Nobel Prizes and Field Medals. Only Wits, UCT (and NWU and UNISA in 2017) were scored on these two criteria, both for alumni and none for faculty. This is 30% of this ranking system, and is the only measure of quality of education (and the only criterion related to teaching and learning). The value of this ranking system for South African institutions, given our context and policy environment focused on additional support for first-generation and under-prepared students, is therefore questionable.

In this ranking system, the two criteria where South African institutions perform well is in terms of publications in the two Science Citation indices (PUB) and in terms of per capita performance (PCP). This suggests that the South Africa's research assessment output policy has achieved its goal of encouraging academics to conduct research and publish in accredited journals.

When comparing the 2018 outcomes to those of 2017, it is evident that, aside from UP, all institutions declined in their performance. Four institutions dropped out of the ranking (UJ, UKZN, NWU and UNISA) and the others (Wits, UCT and SU) retained their same overall band ranking but declined slightly in their individual scores. UP moved up (from 501-600) to the same band as SU (401-500), and performed better in all criteria except those measuring Nobel prizes etc. where it still scored zero. The main improvement for UP was in terms of highly cited researchers (HiCi), where it improved from zero to 9.6. The overall picture for 2017 and 2018 is the same – namely that South African institutions performed best in the various research-focused criteria.

Table 2: 2017 and 2018 ARWU university ranking

Rank		Uni	Alumni (10%)		Award (20%)		HiCi (20%)		N&S (20%)		PUB (20%)		PCP (10%)	
2017	2018		2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
201-300	201-300	**Wits**	18.3	18.3	0	0	15.4	13.5	10.8	10.7	36.7	38.9	21.5	21.8
301-400	301-400	**UCT**	18.3	18.3	0	0	0	0	12.1	11.8	39.9	39.7	21.7	21.2
401-500	401-500	**SU**	0	0	0	0	10.9	9.6	5.5	3.9	32.8	34	17.4	17.4
401-500		**UJ**	0		0		18.9		0		26.6		16.2	
401-500		**UKZN**	0		0		0		8.2		33.6		17.2	
501-600	401-500	**UP**	0	0	0	0	0	9.6	6.1	6.3	33.5	34.1	16.9	17.6
601-700		**NWU**	11.4		0		0		2.1		24.6		12.9	
701-800		**UNISA**	15.2		0		0		2.1		19.0		10.9	

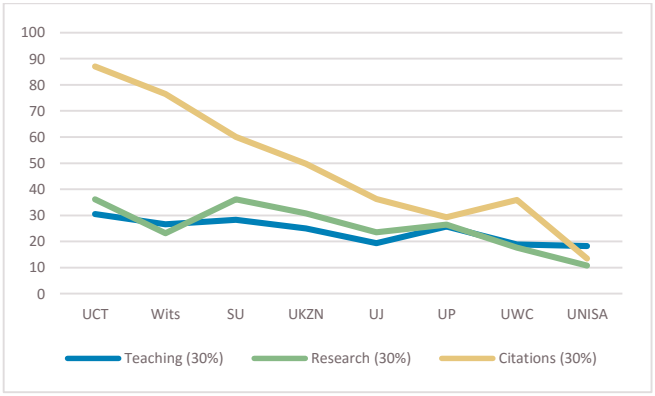
The **Times Higher Education World University Rankings 2018** claims to be the 'only global university performance table to judge research-intensive universities across all of their core missions: teaching, research, knowledge transfer and international outlook'. However, as explained above, the ranking is, nonetheless, biased towards research. The 2018 ranking includes eight South African universities.[xv] While the Top 200 universities are given an exact ranking, those in the next 750 are ranked into groups.

Table 3: Times Higher Education World University Rankings 2018

Institution	Rank	Overall score	Teaching (30%)	Research (30%)	Citations (30%)	Industry income (2.5%)	International outlook (7.5%)
UCT	171	54.4	30.5	36.2	87.0	88.5	81.1
Wits	251-300	45.2-48.2	26.6	23.2	76.5	99.9	69.8
SU	351-400	40.0-42.3	28.3	36.1	60.0	7.3	52.6
UKZN	401-500	35.0-39.9	25.0	30.8	49.8	41.2	59.3
UJ	601-800	21.5-30.6	19.3	23.5	36.3	42.7	55.6
UP	601-800	21.5-30.6	25.7	26.5	29.3	63.5	49.9
UWC	601-800	21.5-30.6	18.8	17.6	35.9	33.3	60.8
UNISA	801-1000	15.6-21.4	18.3	10.8	13.5	32.3	37.5

This ranking system considers teaching and learning (30%) more than either ARWU or URAP, although half of the score is calculated by survey, with the rest a mixture of faculty-student ratio, doctorate to bachelor ratio, doctorates to academic staff ratio and institutional income. South African policy promotes quality teaching and learning at undergraduate level at all institutions, including those that are research-intensive. However, of the THE's criteria, this is the one criterion where all the South African institutions included in the ranking system received an overall score of less than 31. For most institutions this was their lowest score. This is of concern considering challenges with throughput in South Africa, the need for additional teaching and learning support for the majority of students, and the fact that improving the quality of teaching and learning has been a priority for a number of years.

Figure 2: South African performance in three criteria of the Times Higher Education World University Rankings, 2018



As mentioned above, one element of the Teaching criterion is the faculty-student ratio (which accounts for 4.5% of the ranking). This criterion is scored as a ratio (where a lower number indicates fewer students per faculty member) for that specific university rather

than a relative score compared to other universities out of 100. For this criterion, UCT scored 11.7; Wits 24.6; SU 26.1; UKZN 25.3; UJ 27.4; UP 24.1; UWC 31.6 and UNISA 89.6. Of the 1 103 institutions ranked in the 2018 THE ranking, 750 have a ratio of under 20, meaning that only UCT is ranked in the top 750 for this criterion.

South African science policy also focuses on the importance of the relationship between industry and the university (where both UCT and Wits scored very well). Industry income or knowledge transfer only accounts for 2.5% of the overall score, but in South Africa, with the need to grow the economy and the focus on developing a knowledge economy, this is an important indicator. Performance on this indicator is generally high for the South African research-focused institutions, except for Stellenbosch, which appears to be an outlier in this regard.

Finally, the THE ranking system confirms the relative strength of South Africa's research-intensive universities in terms of citations, with UCT, Wits and SU scoring 60 or above for citations.

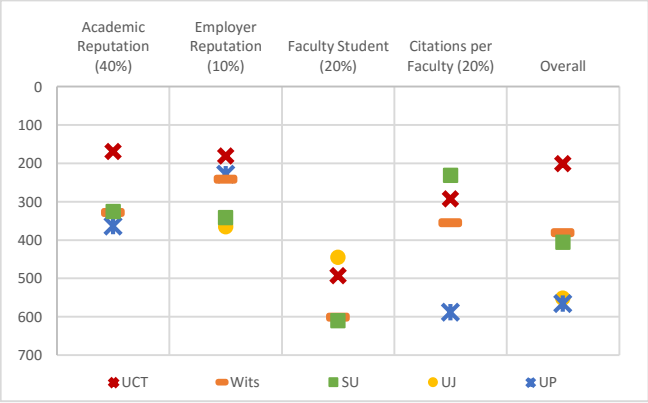
Table 4: The QS World ranking 2019 (produced in 2018) [xvi]

Rank	Institution	Overall score	Academic Reputation (40%)	Employer reputation (10%)	Faculty student (20%)	Int Faculty (5%)	Int Students (5%)	Citations per Faculty (20%)
200	**UCT**	43.9	45.6	47.7	31	72.1	44.8	43.8
381	**Wits**	29	25.1	38.1	14.4	87.1	12.7	35.9
405	**SU**	27.9	25.6	28.9	5.1	57.9	13.2	50.4
551 - 560	**UJ**			26.6	34	73.4	29.7	
561 - 570	**UP**		22.7	40.4		55.3	17	17.4
751 - 800	**UKZN**					49.2		20.1
801 - 1000	**NWU**							
801 – 1000	**RU**						51.6	23.9
801 - 1000	**UWC**					34.4	14.8	20.7

The performance of South African institutions in the **QS ranking system** for each criterion is shown above. However, the QS website allows for institutions to be ranked according to any of the criteria (as long as the institution received a score for it). When ranking by Academic reputation, institutions improve their position, with UCT being ranked 169, SU 325, Wits 328 and UP 363. Similarly, when ranking by Employer reputation all these institutions are ranked higher than when the overall score is used: UCT 180, UP 228, Wits 241, SU 341 and UJ 366. This suggests that these South African universities have a relatively good reputation globally.

The same is evident when using the research indicator (i.e. citations) as SU (231), Wits (355), RU (492), UWC (537), and UKZN (549) all improve their ranking and only UCT 292 and UP 588 drop. This is in line with other ranking systems where South African institutions perform quite well in terms of citations.

Figure 3: Ranking by specific criterion for five South African institutions



When ranking institutions by the number of international faculty, most South African institutions improve their rank (Wits 181, UJ 233, SU 301, UP 315, UKZN 331, UWC 424) while UCT (238) drops slightly. With respect to international students, the spread is more even, with four institutions improving their ranking (RU 283, UJ 430, UP 560, UWC 597), and three

dropping (UCT 314, SU 601+, Wits 601+). However, when it comes to these two internationalisation criteria, it must be remembered that South Africa focuses on transformation of faculty in terms of local previously disadvantaged candidates, and that increasing access for local residents is the focus, rather than attracting international academics. These two criteria also only account for 5% each in the QS ranking system.

The one remaining criterion, and the only one where the majority of South Africa's ranked institutions decline in their ranking when using this as the key indicator, is faculty-student ratio. This is used by the QS ranking system as the measure of teaching quality on the assumption that higher numbers of students increase the burden on academics, and that quality improves with smaller numbers to deal with. Here only UJ improves their rank to 445, while UCT 493, Wits 601+ and SU 601+ all drop. The other institutions are not ranked at all.

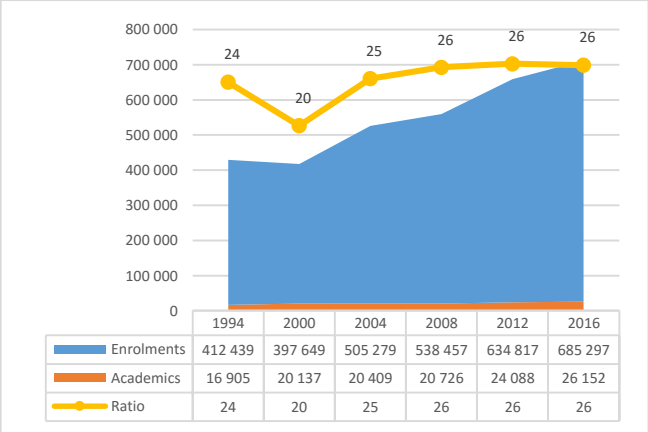
As mentioned earlier, one of the criticisms levelled against rankings systems is that they focus on research (rather than teaching and learning) and encourage institutions to do the same. Nonetheless, when breaking the ranking criteria down as has been done above, it becomes clear that South African institutions could actually improve their ranking (in both the QS and THE ranking systems) by focusing more of the criteria used by these systems as a proxy for teaching quality. The assumption made by these rankings systems is that a lower faculty-student ratio would allow for more focus on individual students and support for them.

The need for more teaching-focused indicators is well-recognised. However, as Altbach points out, '[one] reason teaching and learning has not been included in global rankings is the difficulty of measuring and comparing results across diverse countries, institutions and students.'[xvii] Bibliometric data on research is easy to access and assess, but there is, unfortunately, no easy measure of student success or throughput across diverse contexts. Furthermore, 'there is the necessity to take account of how and what students learn and how they change as a result of their academic experience without simply reflecting the student's prior experience – their social capital'.[xviii] While there are attempts to develop national or regional ranking systems that take teaching and learning into consideration, these cannot easily be internationalised, and are often based on surveys or tests.

THE has launched a 'Europe Teaching Rankings', with 50% drawn from its own student survey. Altbach explains that there is, 'considerable debate about the use of such surveys on an international comparative basis without ensuring a representative sample and accounting for differences among students and the shortcomings of self-reported data'.[xix]

While the ranking systems do not include measures for student throughput, South African cohort data analyses indicate high dropout and slow completion across the system. These data can be determined per institution, field, or qualification. Cohort analyses are available in the various CHE *VitalStats* publications, and they suggest that despite programmes to better support students, a systemic intervention is still required.

Figure 4: FTE academic staff vs FTE enrolments for 1994 to 2016



	1994	2000	2004	2008	2012	2016
Enrolments	412 439	397 649	505 279	538 457	634 817	685 297
Academics	16 905	20 137	20 409	20 726	24 088	26 152
Ratio	24	20	25	26	26	26

In addition, the challenge of high student-faculty ratios is not one which South African universities would be surprised by. Data indicate that the increase in student numbers since 1994 has not been accompanied by the same level of increase in academic staff numbers. This is reflected in the graph above. Considering the number of first-generation students in our institutions,

and the need for additional student support and mentoring, the burden on academic staff is significant.

Regional rankings

Comparing South African universities to others internationally ignores their widely different contexts and priorities, so it is more useful to compare South African institutions to those in countries with similar socio-economic concerns, priorities or challenges. In this regard, relevant ranking systems are those comparing universities in BRICS and Emerging Economies.

Times Higher Education produces a BRICS & Emerging Economies University Rankings (2018 version still to be released). According to the website, this ranking system 'includes only institutions in countries classified as 'advanced emerging', 'secondary emerging' or 'frontier' by the FTSE, including the BRICS nations of Brazil, Russia, India, China and South Africa.' This system uses the same criteria as outlined previously, but 'they are recalibrated to reflect the development priorities of universities in emerging economies'.[xx]

In 2017, the ranking included 300 universities. THE explained that the ranking was dominated by China, with 6 universities in the top 10. India also showed improvement, with the Indian Institute of Science entering the top 15. However, THE reported that 'other BRICS nations are struggling', with Brazil no longer featuring in the top 10; 'half of South Africa's eight universities [having] fallen' and 'Russia's performance [being] more mixed'.[xxi] The ranking (below) shows that two additional South African universities entered the ranking in 2017 (UWC and UJ), four dropped in their ranking, most notably SU, one remained the same and only UP improved its ranking slightly.

Looking into SU in more detail, their overall score declined slightly (43.3 to 34), mainly due to a significant decline in industry income from 100 to 32.1 (and according to the 2018 World Rankings discussed above, this has dropped further to 7.3) and a slight decline in research output (35 to 24.8). This reason for this reported drop in industry income is unclear. *VitalStats* data (2015 and 2016) do not reflect a drop in the proportion of third stream income at SU, with this contributing 44% of revenue in 2015 and 45% in 2016. As this ranking system looks backwards, the 2016 data should have been used for the 2017 ranking. The data in the 2018 World Rankings gives SU an overall score of 40 to 42.3 in 2018, closer to the 2016 score. SU has shown constant improvement in citations over the period and research has improved slightly from 2016 levels. These fluctuations on an annual basis suggest that individual universities should rather track their performance over time.

Table 5: THE BRICS & Emerging Economies Rankings, South African institutions in 2016 and 2017[xxii]

Institution	2017	2016
UCT	4	4
Wits	8	6
SU	42	11
UKZN	58	46
UP	74	77
UWC	102	None
UJ	141	None
UNISA	251-300	197

The QS also produces a BRICS ranking, again largely based on surveys.[xxiii] As with the THE ranking, South Africa's general standing declined from 2017 to 2018 (these QS rankings were published in 2016 and 2017 respectively). Additional institutions were added or ranked in 2018 (NMU and UFH), and while both UP and UJ improved their rank, their overall scores dropped, as did those of all other South African institutions. In both years, only UCT is in the BRICs Top 20, while the number of South African institutions in the Top 100 declined from seven in 2017 to six in 2018.

When looking at the breakdown of the scores by criterion (for the top four South African institutions for 2017 and 2018), all scored high in terms of academic reputation (83.2 - 99.6), employer reputation (79.6 - 96.4) and international faculty (96.7 - 100). Scores for citations differed considerably (31.9 - 96.2) but dropped at all four institutions from 2017 to 2018. Only UCT (and only in 2018) received a score for their faculty-student ratio (49.1).[xxiv]

Table 6: QS BRICS Ranking (2017 and 2018)

Institution	2018		2017	
	Rank	Overall Score	Rank	Overall Score
UCT	19	76.8	14	83.7
Wits	36	66.9	26	76.2
UP	38	64.4	49	67.1
SU	47	60.8	35	72.1
UJ	58	55	63	61.3
UKZN	80	45.2	72	55.3
RU	138	33.1	75	52.7
UWC	146	32.6	111-120	
UFS	161-170	30	131-140	
NWU	181-190	29	151-200	
NMU	191-200	27.6	Not included	
UFH	251-300	-	n/a	
UL	n/a	-	n/a	
UZ	Not included		n/a	

Universities under 50-years old

Another ranking system, which takes an element of context into account, is the ranking of young universities. Both THE and QS produce rankings of institutions which have been formed in the last fifty years, and they include institutions which have undergone a name or status change or merger in the last fifty years.[xxv] In the 2017 THE ranking, 200 universities were ranked, and only one South African institution, namely UJ (151-200), was included. In the QS 2018 list (produced in 2017), three South African institutions were included, namely UJ (91 - 100), UKZN and NWU (both 101 - 150). These were also the only three African universities on the list.

In 2018, THE increased the pool to 250 universities, and two South African universities improved their rank – UKZN was included in the Top 100 (at 83) and UJ improved its rank to 101-150. Only two African universities appeared in the recently released QS 2019 list, with UJ improving their position to between 81 and 90, and UKZN retaining a rank of 101-150.

The 2018 rankings highlight the importance of understanding the criteria when comparing rankings. In the one (QS), UJ is ranked in the 80s and UKZN in the 101 to 150 group, and in THE, this swaps around. What should be remembered here is that QS focuses more (50%) on surveys (i.e. reputation) and on the faculty-student ratio (20%). THE focuses more on research (60%) with teaching and learning accounting for 30% – of which the faculty-student ratio is only 4.5%. As was evident when considering the QS World Ranking, UJ was ranked higher than other institutions for their faculty-student ratio. UKZN's performance is better in those criteria focused more on research, such as the URAP ranking system, the PUB category of ARWU, and the 'research' and 'citations' categories of THE.

Field and Subject rankings

Aside from ranking a university as whole, rankings are also produced by broad field and subject. These are useful in order to identify South Africa's strengths and areas for development, to help decide which institutions to partner with in priority areas, and to determine where to direct funding.

The QS produces a ranking by five fields and 48 subjects.[xxvi] This ranking system makes use of the same academic reputation and employer reputation surveys explained above, as well as citations per paper and the Hirsch or H-index. Citations data are sourced from Scopus, and are used per paper rather than per faculty. A minimum threshold for papers is set and weightings are applied. The H-index is a measure of productivity and impact of scholarly work. This subject ranking is, therefore, largely based on research strength, although in subjects where there is little to no published research, the last two metrics only count for 15% each (instead of 25% each), or are excluded completely. In terms of field, South African institutions were ranked as per Table 5.

Figure 5: QS Rankings by Field, 2018

Institution	Arts & humanities	Engineering & technology	Life sciences & medicine	Natural sciences	Social science & management
UCT	126	298	88	191	110
Wits	216	451-500	203	278	218
UP	264	375	348		255
SU	272	401-450	236	396	259
UJ	364			451-500	401-450
UKZN	401-450		376	393	451-500

The above highlights South Africa's need to focus more on engineering and technology. When considered together with subject rankings (below), it is evident that mineral & mining engineering is a strength, but that other areas in this field need development. In terms of subject rankings (QS), a number of South African institutions were ranked over 100, but only the Top 100 for a subject are listed below. South African strengths (under 50) are archaeology, development studies, geography, sport science and mineral & mining engineering.

Table 7: QS Rankings by Subject, 2018

Subject	Institution	Rank
Agriculture & forestry	SU	51-100
	UCT	51-100
Anatomy & physiology	UCT	51-100
Anthropology	UCT	51-100
	Wits	51-100
Archaeology	Wits	38
	UCT	51-100
Architecture and the built environment	UCT	51-100
Development studies	UCT	11
	Wits	19
	SU	44
	UJ	51-100
	UKZN	51-100
English language and literature	UCT	51-100
Geography	UCT	49
Law	UCT	51-100
Mineral & mining engineering	Wits	15
Social policy & administration	UCT	51-100
Sports science & sport related	UCT	37
Theology, divinity & religious studies	SU	51-100
	UKZN	51-100
	UP	51-100

The URAP also ranks countries by field, using the same criteria as for the world ranking. This is a research focused ranking.[xxvii] The list below shows where South Africa is ranked in the Top 100. While there is much overlap with the QS subject ranking, other strengths identified (Top 50) are anthropology, zoology and veterinary sciences.

Table 8: URAP subject ranking

Agriculture	Rank
SU	95
Studies in human society	
Wits	74
UCT	86
Zoology	
UP	49
SU	85
Wits	89
Archaeology	
Wits	4
UCT	14
Anthropology	
Wits	5
UCT	19
Veterinary sciences	
UP	47
Marine sciences and technology	
UCT	77
Human movement & sport sciences	
UCT	62

The ARWU (2016) produces a Top 200 ranking by field and Top 500 by subject (here only the Top 50 are shown). In terms of field, no South African institutions are ranked in to Top 200 for Natural science and mathematics or for Engineering, technology and computer sciences. For Life and agriculture sciences, UCT is ranked 151-200; for Clinical medicine and pharmacy, Wits is ranked 151-200; and for Social sciences Wits is ranked 101-150. No other African countries are ranked in the Top 200. In terms of Top 50 subjects, the ranking is available for 2017 and 2018. The subject strengths overlap somewhat with those

identified by the QS and URAP rankings, with the addition of hospitality and tourism and public health.

Table 9: ARWU subject ranking (top 50)

Subject	2018		2017	
Mineral & mining engineering	Wits	32	Wits	41
	SU	47	SU	39
	UCT (drop)	76-100	UCT	8
Veterinary sciences	UP	37	UP	30
Hospitality & tourism	UJ	20	UJ	34
Public health			UCT	40

Some priority subject areas where South Africa could focus on improving their rankings are food technology, water management and marine sciences. Regarding Public health, another priority area, UCT was ranked in 2017, but not in 2018, and a number of South African institutions were ranked in the Top 150.

Country rankings

The QS also produces a Higher Education System Strength Ranking, which indicates the fifty strongest higher education systems.[xxviii] South Africa is ranked at 33 for 2018 (with an overall score of 47).[xxix] The ranking is based on four, equally valued, criteria:

System strength which is based on the number of institutions ranked above 700 in the QS World University Rankings, divided by the average position of those institutions in order to give an indication of the country's standing in global rankings. South Africa scored 32.3.

Access considers the number of university places (FTE calculation) available in Top 500 universities, divided by population (using the square root of the population) to show what the possibility is of getting access to a top university. South Africa scored 27.4.

Flagship institution 'assesses the performance of the country's leading institution within the global rankings. This is a normalized score, based on the place each nation's top university occupies in the QS World University Rankings'. South Africa scored 63.9.

Economic context assesses the impact of investment in higher education by comparing the country's financial situation to the performance of institutions in the ranking. A score is awarded for each ranked institution (up to 700) and this is factored against GDP per capita. South Africa scored 64.3.

In assessing this ranking as a whole, only two African countries appear in the 50 countries, namely South Africa (33) and Egypt (42). Five Latin American countries are ranked, namely Argentina (21), Brazil (23), Mexico (31), Chile (32) and Columbia (34). The Top 10 (in order) are: United States, United Kingdom, Australia, Germany, Canada, France, Netherlands, China, South Korea and Japan. Of the BRICS countries, South Africa is the lowest ranked with Russia at 15 and India at 26.

Conclusion

While the annual rankings of universities are hotly debated, South Africa can learn something about its institutions from them. First, in terms of those ranked in the world rankings, it is evident that South African institutions tend to do better in terms of research performance and reputation than in terms of an assessment of the teaching environment. Investment into improving faculty-student ratios could play an important role not only in improving South African institutions' rankings, but also in terms of improving student success. In addition, the evaluation of South African institutions in terms of context-relevant teaching and learning indicators could be useful.

Second, in terms of performance of South Africa as a country, it is useful to note that the URAP includes 18 South African universities in its assessment of the top 12% of institutions worldwide. This is a considerable proportion of our 26 institutions, and includes previously disadvantaged institutions and universities of technology. Lessons can be learnt about what has worked at these institutions, and what can be done to better develop others. Similarly, the QS country ranking system ranks South Africa at number 33. This is better than other African countries, on a par with some South American countries, and lowest of the BRICS countries. The third lesson relates to BRICS and emerging countries – South African institutions have dropped in this ranking system, and South Africa could learn from other emerging economies about the best ways to develop excellence while still increasing access and remaining financially stable.

Finally, in terms of the subject rankings, South Africa can learn about the niche areas of excellence to ensure further development, and sufficient funding, in these areas. Policy makers can also determine which priority areas need more support to ensure the necessary knowledge and skills to support the country's development. These rankings can also be used to determine where to focus in terms of international partnerships.

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[i] J. Butler-Adam (2018) 'Launch of the ASSAf Presidential Roundtable: University Rankings' in *South African Journal of Science*, Volume 114/ No. 3/4, March/ April 2018; M. Makoni (2018) 'The great global rankings debate' in *University World News*, 9 March (496); http://www.assaf.co.za/newsletter/?p=1901;

[ii] J. Butler-Adam (2018) 'Launch of the ASSAf Presidential Roundtable: University Rankings' in *South African Journal of Science*, Volume 114/ No. 3/4, March/ April 2018.

[iii] https://www.topuniversities.com/qs-world-university-rankings/methodology

[iv] http://www.iu.qs.com/university-rankings/indicator-academic/#toggle-id-4; http://www.iu.qs.com/academic-survey-responses/.

[v] http://www.iu.qs.com/employer-survey-responses/.

[vi] P.G. Altbach & E. Hazelkorn (2018) 'Can we measure education quality in global rankings?' in *University World News*, 30 August (517) from: http://www.universityworldnews.com/article.php?story=20180814184535721.

[vii] https://www.timeshighereducation.com/world-university-rankings/methodology-world-university-rankings-2018.

[viii] https://www.timeshighereducation.com/world-university-rankings/methodology-world-university-rankings-2018.

[ix] http://rankingwatch.blogspot.com/2017/06/comparing-the-and-qs-academic.html; https://www.timeshighereducation.com/world-university-rankings/academic-reputation-survey-now-open.

[x] https://www.timeshighereducation.com/world-university-rankings/methodology-world-university-rankings-2018.

[xi] http://www.shanghairanking.com/aboutarwu.html; http://www.shanghairanking.com/ARWU-Methodology-2017.html.

[xii] http://www.urapcenter.org/2017/; http://www.urapcenter.org/2017/methodology.php?q=1.

[xiii] http://www.urapcenter.org/2017/indicators.php.

[xiv] http://www.urapcenter.org/2017/world.php?q=MS0yNTAw.

[xv] https://www.timeshighereducation.com/world-university-rankings/2018/world-ranking#!/page/0/length/25/locations/ZA/sort_by/scores_overall/sort_order/asc/cols/stats.

[xvi] https://www.topuniversities.com/university-rankings/world-university-rankings/2019.

[xvii] Altbach & Hazelkorn (2018) 'Can we measure education quality in global rankings?' in *University World News*, 30 August (517) from: http://www.universityworldnews.com/article.php?story=20180814184535721.

[xviii] Ibid.

[xix] Ibid.

[xx] https://www.timeshighereducation.com/world-university-rankings/2017/brics-and-emerging-economies-university-rankings#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/stats.

[xxi] https://www.timeshighereducation.com/world-university-rankings/2017/brics-and-emerging-economies-university-rankings#!/page/0/length/25/locations/ZA/sort_by/rank/sort_order/asc/cols/stats.

[xxii] https://www.timeshighereducation.com/world-university-rankings/2016/brics-and-emerging-economies-0#!/page/0/length/25/locations/ZA/sort_by/rank/sort_order/asc/cols/stats.

[xxiii] https://www.topuniversities.com/university-rankings/world-university-rankings/2019.

[xxiv] https://www.topuniversities.com/university-rankings/brics-rankings/2018; https://www.topuniversities.com/university-rankings/brics-rankings/2016.

[xxv] https://www.timeshighereducation.com/world-university-rankings/2017/young-university-rankings#!/page/0/length/25/locations/ZA/sort_by/rank/sort_order/asc/cols/stats; https://www.timeshighereducation.com/world-university-rankings/2018/young-university-rankings#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/stats; https://www.topuniversities.com/university-rankings/top-50-under-50/2018; https://www.topuniversities.com/university-rankings/top-50-under-50/2019 .

[xxvi] https://www.topuniversities.com/subject-rankings/2018.

[xxvii] http://www.urapcenter.org/2017_Fields/fields.php; http://www.urapcenter.org//2017_Fields/Field_Ranking_by_Country_2017_2018.php.

[xxviii] https://www.topuniversities.com/system-strength-rankings/methodology.

[xxix] https://www.topuniversities.com/system-strength-rankings/2018.