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TO WHOM IT MAY CONCERN

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Rogue's Gallery – South African university website visibility

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Abstract

South Africa has 23 universities of a variety of descriptions. The current generation of potential students often use search engines to collect information about universities, which could influence their final choice of where to enroll. The increase in mobile web usage has also contributed to an increase in university web access for timetables, exam results and course details. As a result, university websites have joined commercial websites, fighting for top rankings for certain search queries. The purpose of this research project was to evaluate the 23 South African university homepages using a proven academic model. The most important contributing elements of website visibility were identified on each website, measured, and a scoring system designed. This system enabled the researcher to allocate points on a sliding scale for visibility to search engine crawlers. The results proved that South African university homepages spanned a wide range of scores, from webpages meeting most criteria to those scoring rather low overall. It was clear that in some cases, no effort was made to assist search engine crawlers to find websites with ease and index them well. In these cases, it could have a serious effect on the ease with which the student body's expectations of relevant search results can be met. Suggestions are made on how to improve the situation.

Keywords: Website visibility, tertiary websites, keywords, South Africa

1. Introduction

It has been proven in research that commercial companies using their website as main marketing tool, need to rank highly on a search engine result page (SERP), in order to attract a large volume of traffic (Beldona *et al*, 2011). This is required to ensure not only a return on investment but also survival. Users are unlikely to visit many search engine results past the first page – see Figure 1. This tendency has created intense competition for high SERP rankings, to the point of driving some Web designers to use unscrupulous methods for this purpose.

Traditionally the education world has been saved from this commercial rush. However, the advent of social media, and an increase in user Internet usage, has changed young users' (including potential students) attitude. It appears as if they are expecting the same presence and response to their information needs from Higher Education Institutions (HEIs). Research has proven that universities should position themselves in a global market to ensure survival (Nicolae & Marinescu, 2010).

This would imply that universities are not only expected to deliver more and more web-based services to their students, but are also competing for clients on the Web. This puts HEI websites in a similar league as commercial ones.

What percentage of users read only the 1st SERP?	What percentage of users read only the 1st and 2nd SERP?	What percentage of users read only the 1st, 2nd and 3rd SERP?	Source
46.7%		83%	Neethling (2008)
	96%		Wagner (2008)
62%		90%	iProspect (2006)
	80%		George (2005)
		99%	Zhang and Dimitroff (2004)
85%			Henzinger et al. (2002)
58%			Jansen (2000)
85%			Silverstein et al. (1999)
67%	88%	91%	Averages

Figure 1: Tendency of users to visit only early search engine result pages (Weideman 2009:32)

These facts provide the motivation behind this research project. At least the homepages of university websites should be visible to information seekers, who could convert to become paying customers. The research problem is that no empirical results or other form of guidance could be found to indicate the degree of university homepage visibility in South Africa. This lack of information implies that an HEI cannot take steps to improve the visibility of their homepage, thereby improving the rate of customer conversion.

2. Background and other research

2.1 SA Universities

South Africa has an interesting and chequered history of its HEIs. During the past decade there have been a number of mergers, reducing the total of 36 universities and technikons to 23 universities of various descriptions. These mergers were initially met with much opposition and criticism, but they have been completed at this time, to the point where even the (sometimes combined) HEI websites have been implemented. See Table 1 for a summary of the current universities. The "CODE" column lists the code used in this research for each university. The "TOWN" column lists the only or main campus, except in the case of multi-campus universities, where the first campus (alphabetically) is listed, with a + sign to indicate that there are others (Wikipedia, 2011).

Table 1: List of South African universities

CODE	NAME	TYPE	TOWN	URL
CPUT	Cape Peninsula University of Technology	Uni of Technology	Bellville +	www.cput.ac.za
CUT	Central University of Technology	Uni of Technology	Bloemfontein +	www.cut.ac.za
DUT	Durban University of Technology	Uni of Technology	Durban +	www.dut.ac.za
MUT	Mangosuthu University of Technology	Uni of Technology	Umlazi	www.mut.ac.za/
NMMU	Nelson Mandela Metropolitan University	Comprehensive	George +	www.nmmu.ac.za
NWU	North-West University	Traditional	Mafikeng +	www.nwu.ac.za
RU	Rhodes University	Traditional	Grahamstown	www.ru.ac.za
TUT	Tshwane University of Technology	Uni of Technology	Pretoria	www.tut.ac.za
UCT	University of Cape Town	Traditional	Cape Town	www.uct.ac.za
UFH	University of Fort Hare	Traditional	Alice +	www.ufh.ac.za
UFS	University of the Free State	Traditional	Bloemfontein	www.ufs.ac.za
UJ	University of Johannesburg	Comprehensive	Johannesburg	www.uj.ac.za
UKZN	University of KwaZulu-Natal	Traditional	Durban +	www.ukzn.ac.za
UL	University of Limpopo	Traditional	Ga-Rankuwa +	www.ul.ac.za
UNISA	University of South Africa	Comprehensive	Pretoria +	www.unisa.ac.za
UP	University of Pretoria	Traditional	Illovo +	www.up.ac.za
US	University of Stellenbosch	Traditional	Bellville +	www.sun.ac.za
UV	University of Venda	Comprehensive	Thohoyandou	www.univen.ac.za
UWC	University of the Western Cape	Traditional	Bellville	www.uwc.ac.za
UWITS	University of the Witwatersrand	Traditional	Johannesburg	www.wits.ac.za
UZ	University of Zululand	Comprehensive	Empangeni	www.unizulu.ac.za
VUT	Vaal University of Technology	Uni of Technology	Vanderbijlpark	www.vut.ac.za
WSU	Walter Sisulu University	Comprehensive	Butterworth +	www.wsu.ac.za

The focus of this research project was on the homepages of these universities – specifically the ease with which search engine crawlers could index them, enabling users to later find them through search engines.

2.2 Website visibility

The degree of ease with which a search engine crawler can find and index a webpage is termed its visibility. A number of similar terms are used to describe this attribute, and some research has been done on its elements. One study investigated the "Internet Visibility" of Turkish websites, but found that it was impossible to use only one attribute to measure this feature (Oralalp, 2010). Other authors attempted to find a way to quantitatively evaluate a website's visibility, and identified four activities and several tasks to this end (Espadas *et al*, 2008). Weideman defined a model which identified and ranked both positive and negative website visibility elements (Weideman, 2009).

E-commerce websites are the main point of entrance for potential customers, and should have a high degree of visibility to Internet searchers. One study has proved that there is relationship between hyperlink data and traffic ranking (Rathimala, 2010). A similar study, also on e-commerce websites, proved that there is positive relationship between the effort a company expends on making their website visible and its financial success (Ghandour, 2010).

In the education world, a university website is considered to be the flag-bearer of the institute's quality of education and research. At the same time there has been a paradigm shift towards social media and, especially amongst the younger generation, an acute awareness of technology and the Internet. The combination of these two factors has moved the traditional university website from operating mostly in the academic sphere to the public realm, where potential and current students interact with university websites as part of their daily lives. One author used the term "Institution footprint in the Web" as an indicator of website visibility, and defined three indicators for this measurement: activity, impact and usage. This author continued to construct a university ranking system, which consistently placed North American and Canadian universities above European ones (Aguillo, 2009). A number of research projects have been done on the *academic ranking* of a university, which is different from the *visibility ranking* (Sugak, 2011). Other, non-peer reviewed sources for these academic rankings include:

- <http://www.timeshighereducation.co.uk/world-university-rankings/2010-2011/top-200.html>
- <http://www.topuniversities.com/university-rankings/world-university-rankings>
- <http://www.webometrics.info/>
- <http://www.guardian.co.uk/education/universityguide>

The large effect of the quantity and quality of inlinks on website visibility was noted by some authors. In one case, a hyperlink analysis was done on seven Canadian Faculty websites, finding certain visibility patterns of clusters inside these websites – hyperlink analysis was used as only tool (Yi *et al*, 2008). This has lead the author of the current research to base the empirical experiments to follow on the Weideman model, since it has also indicated the value of inlinks to carry the highest weight in determining website visibility (Weideman, 2009). See Figure 2 and Table 2 for a summary of the factors which should be present in a website to improve its visibility, in a ranked format.

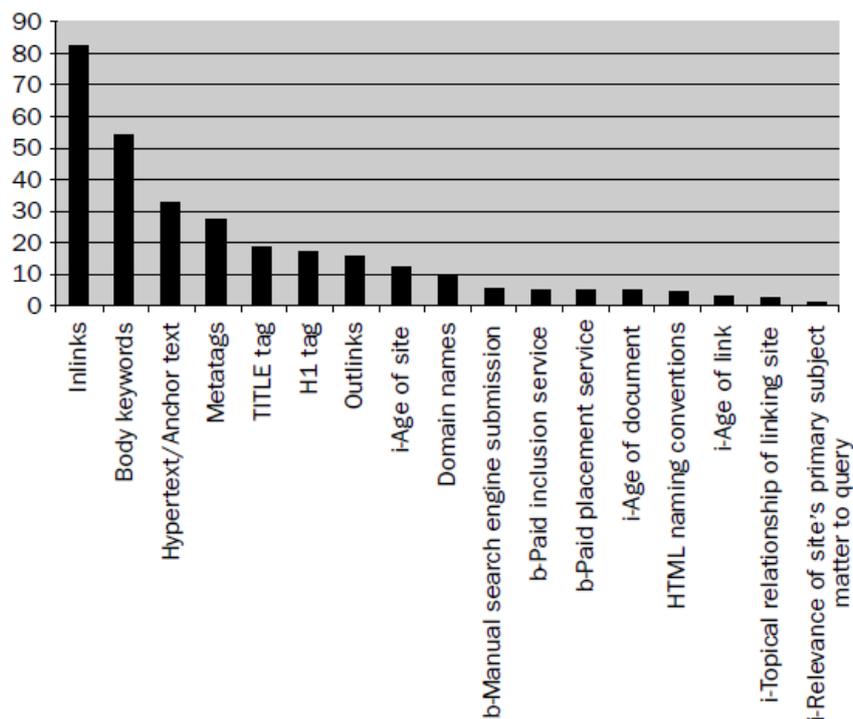


Figure 2: The positive contributing factors to Website Visibility (Weideman, 2009)

Similarly, certain website design factors detract from a website's visibility, and should not be applied in its design. These are summarized in Figure 3.

Table 2: The Website visibility element scoring (Weideman, 2009)

Elements	Score
Inlinks	82.3
Body keywords	54.0
Hypertext/anchor text	32.8
Metatags	27.3
TITLE tag	19.3
H1 tag	17.1
Outlinks	15.9
i – Age of site	12.1
Domain names	9.1
b – Manual search engine submission	5.0
b – Paid inclusion service	5.0
b – Paid placement service	5.0
i – Age of document	5.0
HTML naming conventions	4.4
i – Age of link	2.9
i – Topical relationship of linking site	2.1
i – Relevance of site's primary subject matter to query	0.7

One recent addition to popular literature lists an attempt to not only list and classify but also rank the elements to be used in search engine optimization, contributing to website visibility (Sullivan, 2011). However, no evidence could be found that this model is based on research – it appears to be simply based on industry experience.

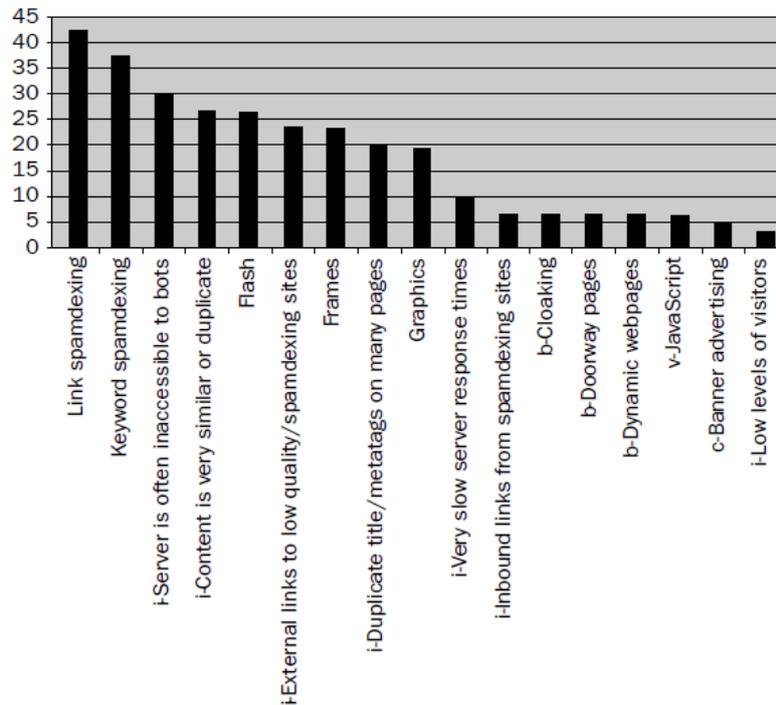


Figure 3: The negative contributing factors to Website visibility (Weideman, 2009)

3. Methodology and results

Each university domain name was found through standard Internet searching and URL “guessing”. For example, the domain of the University of the Free State was “guessed” to be www.ufs.ac.za. The domain found was inspected in terms of the sub-domain names, content, contact detail and logo to ensure that it was actually the official university website. If any one of these elements indicated that it was not the official university website, the process was repeated. In all cases the authenticity of each domain was confirmed with a telephone call to the main switchboard telephone number listed on the university contact page.

Part of the motive for this research project was to demystify website visibility and enable website designers to include it as part of their design strategy. Also, it was assumed that not all universities had a serious interest in making their website visible, and would therefore not have access to expensive speciality programs. As a result, it was considered prudent to use both free and easily accessible website tools for visibility measurements, instead of dedicated, expensive tools used by professionals. Any elements which could not be measured using these tools would be omitted from this research. This would enable these designers to repeat the measurements done during this project at a later stage, to determine whether or not there have been any improvements after possible changes they have made.

Furthermore, a decision had to be taken on how the weighting of the website visibility measurements was to be done. All elements contributing to website visibility are not equally important. A few models were found, but all of them bar one were based on hunches or estimates only (Sullivan, 2011; Weideman, 2009). The only model based on proven research found was the one produced by the author, as listed in Figures 2 and 3.

Finally, the freely available tools mentioned earlier were inspected, and the website visibility elements they could measure were identified. Alexa, Ranks and Grader respectively were identified as providing trustworthy and useful information, without the need for registration and payment. See Figure 4 for details. The elements indicated in rectangular boxes are those which could be measured, but were not included in this research, since they do not form part of the Weideman model (traffic ranking, website size, readability level and SE ranking).

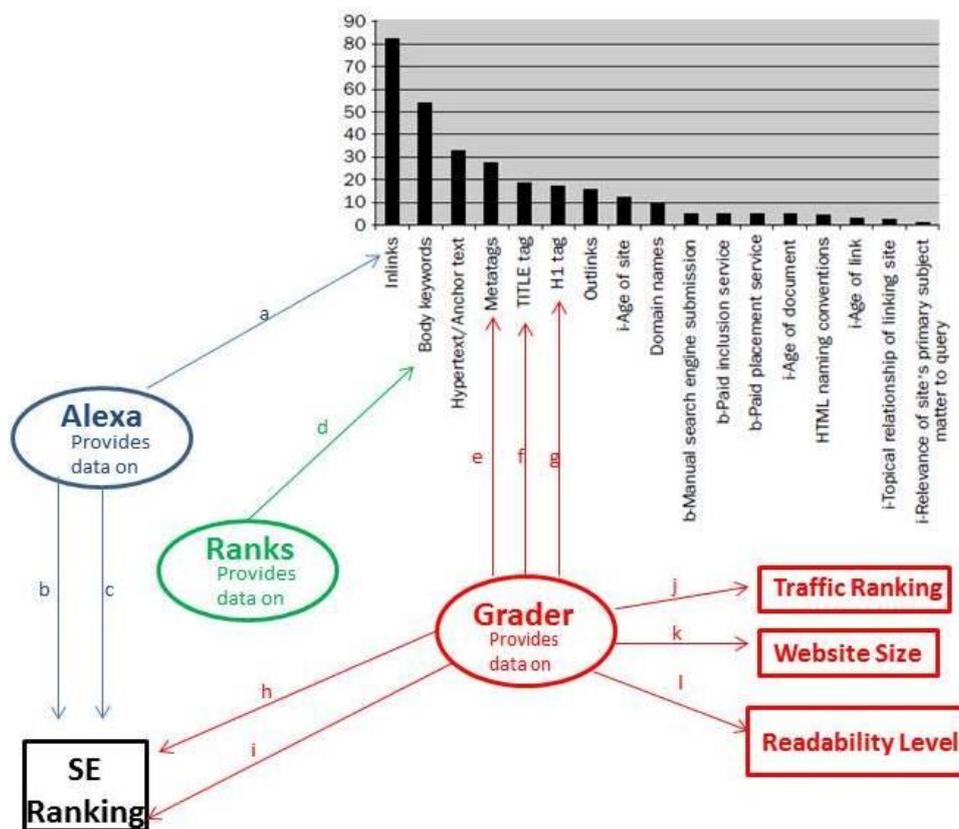


Figure 4: Program and element relationships

3.1 Results

The results of various website visibility measurements are supplied below.

3.1.1 Inlinks

The Weideman model identified the number of inlinks as the most important contributing factor to website visibility. Therefore this value was measured and used

as the first indicator in the research. The Alexa program (www.alexa.com) provides, amongst other things, the number of hyperlinks pointing into a given website – see Figure 5. This value was used in the first set of results, as an indication of the trust bestowed upon the given website by others linking to it.

The weight given to this first element of website visibility is 82.3 (see Table 2), and this figure was used to calculate the score for this element below. The number of inlinks for the 23 universities was used to sort them from high to low, and then a “Rank” was allocated to each one – 23 for the university with the highest number of inlinks, 22 for the second highest, down to 1 for the lowest. This was done to bring the units of measurement in line, and make them comparable.

Site Information for uct.ac.za

[Get Details](#)

-  Alexa Traffic Rank: [21,853](#)
-  Traffic Rank in [ZA](#): 161
- Sites Linking In: [1,315](#)
- none Star

Figure 5: Example from Alexa: UCT inlinks

The actual number of inlinks to each university homepage, plus the ranking from 23 down to 1, and the score (weight x rank) are given in Table 3.

Table 3: Number of inlinks to university homepages

Pos.	University	Alexa - No of inlinks	Rank out of 23	Score = Weight X Rank
1	University of Cape Town	1315	23	1893
2	University of Stellenbosch	838	22	1811
3	University of South Africa	762	21	1728
4	University of the Witwatersrand	756	20	1646
5	University of Pretoria	744	19	1564
6	Rhodes University	708	18	1481
7	University of KwaZulu-Natal	564	17	1399
8	University of the Western Cape	398	16	1317
9	University of Johannesburg	296	15	1235
10	Nelson Mandela Metropolitan University	217	14	1152
11	Cape Peninsula UoT	180	13	1070
12	University of Fort Hare	138	12	988

13	North-West University	131	11	905
14	Tshwane UoT	121	10	823
15	University of the Free State	82	9	741
16	Durban UoT	76	8	658
17	University of Venda	72	7	576
18	University of Limpopo	70	6	494
19	Central UoT	62	5	412
20	Vaal UoT	56	4	329
21	Walter Sisulu UoT and Science	54	3	247
22	Mangosutho UoT	11	2	165
23	University of Zululand	6	1	82

3.1.2 Keywords

The second most important contributing factor to website visibility identified earlier, was the use of keywords in the body of a webpage (see Table 2). This value is more subjective and could not simply be counted as in Section 3.1.1. However, the Ranks program (www.ranks.nl) provides a keyword analyser tool, which counts and analyses the keywords/phrases in a webpage, and determines for which keywords the webpage was optimized. See Figure 6 for an example of how this data is presented by Ranks.

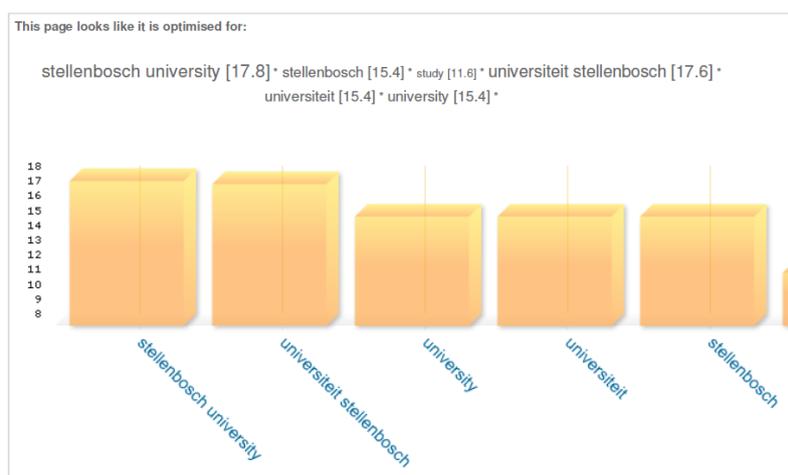


Figure 6: Example of keyword optimization presentation

The author then created a scale on which to allocate scores to university websites, based on which keywords/keyphrases each website was optimized for. Assumptions had to be made on what keywords/phrases are relevant to each university. Since this was impossible to do without involving each university, the assumption was made that students would search for a given university based on their name being well-known. A set of classes was then created, indicating what kind of keyword selection was considered to be well chosen for search engine crawler purposes. Class 1 is the

most relevant combination of keywords, down to Class 7 as being the least useful in this case. For each class, the university(ies) in that class are also listed.

Class 1

At least five keywords/phrases, first keyword/phrase = full university name AND second keyword/phrase = full university name

US

Class 2

At least five keywords/phrases, first keyword/phrase = full university name AND second keyword/phrase = not full university name

UV

Class 3

At least five keywords/phrases, second keyword/phrase = university name abbreviation only

MUT NMMU UKZN UNISA CUT

Class 4

At least five keywords/phrases, first and second keyword/phrase combined = full university name

UFS UZ RU UFH NWU UWITS

Class 5

Could be fewer than five keywords/phrases, keywords/phrases at least descriptive of a university

TUT UWC DUT

Class 6

Could be fewer than five keywords/phrases, some keywords/phrases at least descriptive of a university

UP UJ

Class 7

No indication of website content related to a university

CPUT VUT UL UCT WSUT

The weight given to this second element of website visibility is 54.0 (see Table 2), and this figure was used to calculate the score for this element below. In this case an exact ranking (i.e. 23, 22, down to 1) could not be done, due to the subjective nature of the measurement, and universities were grouped into classes, where their optimization was found to be similar. Those in one class would then receive the same score. As an example, the first part of this ranking was calculated as follows:

23	Class 1	US
22	Class 2	UV
21	-	
20	-	
19	-	

18	-	
17	Class 3	CUT, MUT, NMMU, UKZN and Unisa
16	-	

From this listing, US was allocated a ranking of 23, the UV 22, and the five members of Class 3 all received a score of 17. The summary of these scores is given in Table 4.

Table 4: Scoring of university homepage ranking for keyword usage

Pos	University	Rank	Score = Weight X Rank
1	University of Stellenbosch	23	1242
2	University of Venda	22	1188
3	Central UoT	17	918
4	Mangosutho UoT	17	918
5	Nelson Mandela Metropolitan University	17	918
6	University of KwaZulu-Natal	17	918
7	University of South Africa	17	918
8	North-West University	11	594
9	Rhodes University	11	594
10	University of Fort Hare	11	594
11	University of the Free State	11	594
12	University of the Witwatersrand	11	594
13	University of Zululand	11	594
14	Durban UoT	8	432
15	Tshwane UoT	8	432
16	University of the Western Cape	8	432
17	University of Johannesburg	6	324
18	University of Pretoria	6	324
19	Cape Peninsula UoT	1	54
20	University of Cape Town	1	54
21	University of Limpopo	1	54
22	Vaal UoT	1	54
23	Walter Sisulu UoT and Science	1	54

3.1.3 Anchor Text

This third element was not included in this research, since it could not be easily measured using any of the free tools available, as indicated in Section 3.

3.1.4 DESCRIPTION Metatag

The fourth contributing factor to website visibility identified earlier, was the use of the DESCRIPTION metatag in the header of a webpage (see Table 2). This is another

subjective measurement which could not be counted as in Section 3.1.1. The Grader program (www.grader.com) has a metatag tool, which extracts and displays metatags of a webpage. See Figure 7 for an example of how this data is presented by Grader.

Meta Description	The mission of Mangosuthu University of Technology, as an institution of science and technology, is to provide superior quality, technologically advanced programmes and services in the fields of engineering, natural and management sciences which contribute to eradicating inequalities in higher education
------------------	--

Figure 7: Example of DESCRIPTION metatag

Again a scale was created to allocate points to universities, based on the value of their DESCRIPTION metatag to search engine crawlers. Best practice prescribes that this metatag should consist of one or more English sentences, fully loaded with keywords, which conveys the essence of the webpage content to the reader. This text also appears on search engine result pages, and is therefore seen by users.

Again a class set was created for categorizing all the universities in terms of the value of their DESCRIPTION metatag. Class 1 is the most “useful” metatag, down to Class 4 being no metatag at all. For each class, the university(ies) in that class are also listed.

The weight allocated to this website visibility element was 27.3 (see Table 2), and this figure was used to calculate the score for this element.

Class 1

At least one well-written English sentence, university descriptive, keyword rich
MUT UKZN UZ

Class 2

At least one English sentence, university related, some relevant keywords
CPUT

Class 3

Some related keywords
US RU UFS DUT

Class 4

No DESCRIPTION metatag
UL UV UWITS NWU UWC UFH UCT TUT CUT NMMU UJ VUT UP UNISA
WSUT

The summary of the ranking and scores for the 23 universities is given in Table 5.

Table 5: Scoring of university homepage ranking for DESCRIPTION metatag usage

Pos.	University	Rank	Score = Weight X Rank
1	Mangosutho UoT	21	573
2	University of KwaZulu-Natal	21	573
3	University of Zululand	21	573
4	Cape Peninsula UoT	20	546
5	Durban UoT	16	437
6	Rhodes University	16	437
7	University of Stellenbosch	16	437
8	University of the Free State	16	437
9	Central UoT	1	27
10	Nelson Mandela Metropolitan University	1	27
11	North-West University	1	27
12	Tshwane UoT	1	27
13	University of Cape Town	1	27
14	University of Fort Hare	1	27
15	University of Johannesburg	1	27
16	University of Limpopo	1	27
17	University of Pretoria	1	27
18	University of South Africa	1	27
19	University of the Western Cape	1	27
20	University of the Witwatersrand	1	27
21	University of Venda	1	27
22	Vaal UoT	1	27
23	Walter Sisulu UoT and Science	1	27

It was evident that a surprising number of university websites had no DESCRIPTION metatag – see Figure 8 for an example.

Page Title	Wits University - Wits University
Meta Description	--missing--

Figure 8: Example of a non-existent DESCRIPTION metatag

3.1.5 TITLE tag

The TITLE tag of a webpage is an optional textual element, which, if present, will be displayed by the browser in the Title bar, and is also displayed by some search engines in result pages. However, much more important is the fact that search engine algorithms accrue value to a well-written TITLE tag in the process of

determining ranking on SERPs. According to model of choice, this factor has a weight of 19.3 (see Table 2).

Again a scale was created, subdividing the 23 universities into classes, depending on the content of their homepage TITLE tags.

Class 1 Contains full university name, plus other closely related university terms
DUT

Class 2 Contains full university name, plus country name
MUT

Class 3 Contains full university name only
UV UWITS UFS US UL UKZN TUT CUT CPUT

Class 4 Contains full university name, plus other value-less terms
UCT UFH UWC UZ NWU

Class 5 The first words are value-less (eg “Welcome to”), the remaining ones are relevant
RU WSUT

Class 6 Contains university related keywords, but do not contribute any value
UNISA UP

Class 7 Contains no words at all, or “Home”.
VUT UJ NMMU

One example of a well-written TITLE tag follows in Figure 9.

Page Title	Durban University of Technology: Community Engagement, Frequently Asked Questions, Academic, Institutional Support, Prospective Students, Current Students
------------	--

Figure 9: Example of a well-written TITLE tag

The summary of the ranking and the score for TITLE tag use is given in Table 6.

Table 6: Scoring of university homepage ranking for TITLE tag usage

Pos.	University	Rank	Score = Weight X Rank
1	Durban UoT	23	444
2	Mangosutho UoT	22	425
3	Cape Peninsula UoT	13	251
4	Central UoT	13	251

5	Tshwane UoT	13	251
6	University of KwaZulu-Natal	13	251
7	University of Limpopo	13	251
8	University of Stellenbosch	13	251
9	University of the Free State	13	251
10	University of the Witwatersrand	13	251
11	University of Venda	13	251
12	North-West University	8	154
13	University of Cape Town	8	154
14	University of Fort Hare	8	154
15	University of the Western Cape	8	154
16	University of Zululand	8	154
17	Rhodes University	6	116
18	Walter Sisulu UoT and Science	6	116
19	University of Pretoria	4	77
20	University of South Africa	4	77
21	Nelson Mandela Metropolitan University	1	19
22	University of Johannesburg	1	19
23	Vaal UoT	1	19

3.1.6 H1 tag

The final factor considered in this research is the presence and usage of HEADER tags in the homepages. These tags are used to simply indicate the importance of certain text pieces above others, much like larger fonts and boldfacing would be used in a word processing document. An H1 tag indicates a heading of high importance, H2 slightly lower, etc. A browser will display the text associated with each H tag larger or smaller, as appropriate. According to Table 2, the weight of this factor is 17.1, and again the universities are clustered into classes according to their usage of these tags.

Class 1 One H1, very descriptive, some H2 and H3, very descriptive
NONE

Class 2 One H1, very descriptive, no other H's
NONE

Class 3 One H1 present, some H2 and H3 present
UJ RU

Class 4 No H1 present, some H2 and H3 present
CPUT UWC UWITS UFH TUT UNISA UCT UKZN

Class 5 Multiple H1 present OR no H's
MUT VUT US NMMU UV WSUT UP NWU UZ UFS UL DUT CUT

An example of the proper use of the H tags is given in Figure 10.

Heading Type	Text
First-Level (H1)	Welcome-Siyakwemukela-Welkom-Re a le amogela
Third-Level (H3)	What's New?
Third-Level (H3)	(Hidden) What's New? (Old)
Third-Level (H3)	Events
Third-Level (H3)	(Hidden) Events (Old)

Figure 10: Example of a H1 and other tag reporting

A summary of the 23 universities' rank and scoring is supplied in Table 7.

Table 7: Scoring of university homepage ranking for H-tag usage

Pos.	University	Rank	Score = Weight X Rank
1	Rhodes University	22	376
2	University of Johannesburg	22	376
3	Cape Peninsula UoT	14	239
4	Tshwane UoT	14	239
5	University of Cape Town	14	239
6	University of Fort Hare	14	239
7	University of KwaZulu-Natal	14	239
8	University of South Africa	14	239
9	University of the Western Cape	14	239
10	University of the Witwatersrand	14	239
11	Central UoT	1	17
12	Durban UoT	1	17
13	Mangosutho UoT	1	17
14	Nelson Mandela Metropolitan University	1	17
15	North-West University	1	17
16	University of Limpopo	1	17
17	University of Pretoria	1	17
18	University of Stellenbosch	1	17
19	University of the Free State	1	17
20	University of Venda	1	17
21	University of Zululand	1	17
22	Vaal UoT	1	17
23	Walter Sisulu UoT and Science	1	17

3.2 Combination of visibility elements

Finally, the cumulative value of each university's score can be tabulated. The total of each of the "Score" columns in Figures 3 to 7 were added to provide the TOTAL column in Table 8.

A higher value indicates a higher degree of website visibility of the homepage.

The theoretical minimum and maximum any university could earn are calculated as follows:

Minimum: for each one five measured elements, the lowest rank is 1, so adding the weights of these five elements would yield the lowest score. Thus: $82.3 + 54 + 27.3 + 19.3 + 17.1 = 200$

Maximum: this value would be the sum of: the individual weights x 23 (the maximum rank). Thus: $200 \times 23 = 4600$.

Therefore the potential variation in score is between 200 and 4600, and the actual values vary from 447 to 3757.

Table 8: Total scoring of university homepage rankings

Pos.	University	TOTAL
1	3 - University of Stellenbosch	3757.4
2	6 - University of KwaZulu-Natal	3380.7
3	5 - Rhodes University	3004.2
4	8 - University of South Africa	2990.2
5	4 - University of the Witwatersrand	2757.6
6	1 - University of Cape Town	2368
7	7 - University of the Western Cape	2169.9
8	Cape Peninsula UoT	2160.2
9	Nelson Mandela Metropolitan University	2133.9
10	Mangosutho UoT	2097.6
11	University of Venda	2059.4
12	University of the Free State	2039.5
13	2 - University of Pretoria	2009.3
14	University of Fort Hare	2002.7
15	Durban UoT	1988.2
16	9 - University of Johannesburg	1981.3
17	Tshwane UoT	1772.6
18	North-West University	1698.1
19	Central UoT	1624.8

20	University of Zululand	1421.1
21	University of Limpopo	843.1
22	Walter Sisulu UoT and Science	461.1
23	Vaal UoT	446.9

4. Analysis and conclusion

The results indicate that there is a wide spread of website visibility scores for the 23 South African universities. The highest score is more than 8.4 times that of the lowest scoring university. This implies that there is a significant difference between some universities in the design quality of website homepages.

There is also a small variance between the possible and actual extreme values. The possible minimum is 200, where the actual minimum is 447, and the difference between the possible and actual maximum is the difference between 3757 and 4600. Thus the best- and worst scoring universities are each not far from each end of the scale. This leads to the conclusion that South African universities occupy a large portion of the spectrum of scores, varying from quite low to quite high.

In some cases gross ignorance of basic best practice guidelines were evident. This includes:

- The six universities earning the lowest score for keyword usage, had no indication of the content visible in their keyword usage
- A remarkable 15 universities had no DESCRIPTION metatag present on their homepage
- more than half of the population had no or multiple H1 tags present in their homepage

These omissions represent a serious flaw in the basics of visible website design. A relatively small amount of effort could drastically improve this situation. The conclusion here is that both university webmasters and management alike are probably not aware of the importance of website visibility.

Furthermore, any university website designer could simply view the source code of other (and even of top world university) webpages, gleaning ideas of how to improve for example: HEADER tags, the TITLE tag and the DESCRIPTION metatag. Alternatively, the homepage details of the “winner” in each of the five categories presented here could be skimmed and adjusted for use of a low-scoring homepage.

Finally, a comparison was made between the *visibility ranking* done in this research and the *academic ranking* done in one popular source of such rankings (Webometrics, 2011). The top 10 academic universities in 2011 for Africa, as calculated by the source, includes nine from South Africa. These nine, and their position in the academic ranking, are indicated in bold numbering in the “University” column of Table 8.

In final conclusion it can be claimed that there appears to be a strong correlation between academic and visibility rankings. The following observations can be noted:

- the seven highest scorers in the visibility rankings occupy seven of the eight top positions in the academic rankings
- only two of the top ten visibility scorers are outside the top ten in the academic rankings
- one university (UWC) has identical rankings – 7th in both cases

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References

Aguillo, I. 2009. Measuring the institution's footprint in the web. *Library Hi Tech*, 27(4): 540-556.

Beldona, S, Lin, K & Chen, M. 2011. Hotel Trademarks in Organic Search: A Longitudinal Cross-National Study. *Journal of Travel Research*. Available WWW: <http://jtr.sagepub.com/content/early/2011/03/07/0047287511400612.abstract> (accessed 20 July 2011).

Espadas, J., Calero, C. and Piattini, M. 2008. Web site visibility evaluation. *Journal of the American Society for Information Science and Technology*, 59: 1727–1742.

Ghandour, A, Benwell, G and Deans, K. 2010. The relationship between website metrics and the financial performance of online business. *ICIS 2010 Proceedings*. Available WWW: http://aisel.aisnet.org/icis2010_submissions/27 (accessed 30 June 2011).

Higher Education in South Africa – HESA. 2011. Available WWW: <http://www.hesa.org.za/sa-universities> (accessed 30 June 2011).

Lagun, D. & Agichtein, E. 2011. ViewSer: a tool for large-scale remote studies of Web search result examination. *Proceedings of the 2011 annual conference on human factors in computing systems*, CHI EA '11, 2011. New York, NY, USA:292–296.

Nicolae, M. & Marinescu, R. 2010. University Marketing – innovative communication for effective international survival. *Journal for Communication Studies*. Available WWW: <http://www.essachess.com/index.php/jcs/article/view/89> (accessed 20 July 2011).

Oralalp, S. 2010. Analysis of Turkey's visibility on global Internet. Unpublished Master of Science thesis, Middle East Technical University, Turkey.

Rathimala, K. and Marthandan, G. 2010. Exploring hyperlink structure of electronic commerce websites: a Webometric study. *International Journal of Electronic Business*, 8(4-5): 391-404.

Sugak, D.B. 2011. Rankings of a University's Web Sites on the Internet. *Scientific and Technical Information Processing*, 38(1): 17 – 19.

Sullivan, D. 2011. Introducing: The Periodic Table Of SEO Ranking Factors. Available WWW: <http://searchengineland.com/introducing-the-periodic-table-of-seo-ranking-factors-77181> (accessed 21 July 2011).

Webometrics, 2011. Ranking Web of World Universities. Available WWW: http://www.webometrics.info/top100_continent.asp?cont=africa (accessed 21 July 2011).

Weideman, M. 2009. *Website visibility: the theory and practice of improving rankings*. Oxford: Chandos Publishing.

Wikipedia, 2011. List of Universities in South Africa. Available WWW: http://en.wikipedia.org/wiki/List_of_universities_in_South_Africa (accessed 21 July 2011).

Yi, K. and Jin, T. 2008. Hyperlink analysis of the visibility of Canadian library and information science school web sites. *Online Information Review*, 32(3): 325-347.