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Pilot Study on Webometric for Assessing User Footprint, Satisfaction and Experience on Academic Website: A Case of the University of Delta Agbor

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ABSTRACT

Webometric assesses the user convenience and experience while interacting with web-based system. Businesses use websites to present their deliverables to a larger audience. The aim of which is to refocus and reshape a user's image of about a business. This has today, been extended to facilitate activities like recruitment etc. We investigate usability of the University of Delta Agbor (UniDEL) website with other select Nigerian varsities using expert review guideline, and to compare the achieved criterion scores against the selected varsities websites. The adopted methodology is the expert review guideline that is available by the World Ranking of Universities. Result shows the overall performance with UniDEL website performing poorly against the selected websites. These are based on the unique strengths and unique gaps. Unique features showed that selected websites successfully ensured that her trust/credibility section and homepages received highest scores. The UniDEL's website was found to struggle for good search usability, and data entry criteria among other flaws in her web design. Findings suggest UniDEL website needs to be reworked with home-pages, search, trust and content features in mind to ensure greater visibility and user experience.

1. INTRODUCTION

The Internet has continues to advance the field of informatics by housing web-contents as studies continue to seek effective means to acquire the desired knowledge (Agarwal & Venkatesh, 2002; Chen et al., 2022). As users satisfy her ever-growing data need delivered across platforms, knowledge engineers and experts continues to proffer better techniques and processes to deliver these to their clients (Iyoboyi & Musa-Pedro, 2020; Pedro, 2020). Thus, it has become critical for designers to build sites to satisfy user experience and interaction. Many institutions today, use rich web-contents to aid high and better visibility. This benefits them, promoting their products in a competitive market (Yoro & Ojugo, 2019a, 2019b). Every good website should refocus a user's image about an organization. Designing a website is quite daunting, and rippled with challenging feats such as navigation, contents, openness etc – all of which guides a user as s(he) peruse its pages, to keep users' interest engaged and leads to satisfied experience, and knowledge outcome (Allenotor et al., 2015; Allenotor & Ojugo, 2017; Peterson, 2006).

A major reason for the growing scientific interest over the Internet is in the already high and ever-growing number of web-user, server, apps and contents (Crawford et al., 2020; Tarafdar & Zhang, 2005). Despite a variety of search engines, Google has been dominant and her success can be attributed to its ability

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to offer larger index, innovative new services, highly optimized performance and usability for the web (Albert & Tom, 2013; Chevalier et al., 2003). Study about navigation carried out in various dimensions as the field of web usage mining ensures a navigation pattern as users visits a site and its data are recorded in the web-log (Björneborn & Ingwersen, 2004; Gray & Salzman, 1998; Haipinge et al., 2022).

1.1 Web Usability

Website usability aims to investigate the quality or degree of a user's experience, and corresponding convenience while interacting with the site (Eboka & Ojugo, 2020; Kantner & Rosenbaum, 1997). Improving a website's usability help users gain knowledge. Critical analysis into the usability of a site can help designers and site owners also cut down the number of errors in their system delivery, improve precision, and user support uplifting attitude, etc. Its adoption in educational sites, help engage students to increase the learning experience, confidence and encourage to use a site more. Thus, website usability is always from a user's view or standpoint (Borgonovi & Ferrara, 2022; Ibor et al., 2023).

Ojugo and Otakore (2018) Usability is the study of how productive, consistent, easy to use, efficient, organized, intuitive, and can accomplish tasks within a web-page via eased user experience. Users have expectations via past experience within same website. Thus, it is imperative for designers to understand user expectations via task analyses (Ojugo et al., 2014; Ojugo & Otakore, 2018a, 2021). Studies show that users act on their own expectations even with onscreen indications to counter such expectations. Thus, imperative to use familiar formatting and navigation schemes and themes, which makes it easier for users to learn the website layout (Patrinos et al., 2022; Pearson et al., 2007). It is best to assume a certain percent of users will not use a site frequently enough to learn to use it efficiently. Thus, designer uses familiar conventions a user is accustomed to. This works best (Palmer, 2002).

Web-designers create links to their site or page based on the data content relevance and certain interest (Akazue et al., 2023). Often, websites have pages, which is grouped based on hyperlink relations and the site's structure. They, all fall under a single unique class. It is often assumed that a user will preferably visit the next page, which belongs to same class as that of the current page (Oyemade & Ojugo, 2020, 2021). Thus, developers must create a fine structured dominant links that point to pages that define a particular category. All the pages followed by that particular link remain in the same class. The pages are then further categorized into levels based on page ranks in the initial period and later, on frequency of users' access (Ciaccio, 2021). Also, many of the prediction models perform this based on history data or logs; while, others are built by ranking of pages and dynamically update http requests from the users arrive at the server (Baccus et al., 2018; Brooke, 1996; Yoro, Aghware, Akazue, et al., 2023; Yoro, Aghware, Malasowe, et al., 2023).

Website development is a continuous process with an iterative life cycle of analysis, design, and test (Konstantinidou et al., 2019; Younis et al., 2015). In analysing websites, De Bruin et al. (2020) noted 3-measurement means namely: (a) ***structure*** of the site in its organization and navigation links), (b) ***usage*** in frequency of visits, page-view, sessions, unique users, and duration), and (c) ***contents*** (Bruinen de Bruin et al., 2020). They grouped the assessment pattern into a variety of modes – noting various focus on evaluation methods with new categorization system based on the purpose and platforms of evaluation (Amelia et al., 2020). They proposed the distinction as a measure limited to the number of websites based on assigned criteria to achieve high-quality site. Its manual evaluation includes experts testing; while, automatic assessments uses various software-testing tools (Ojugo, Eboka, et al., 2015b).

Kortum and Bangor (2013) investigated the views of 178-users from 5-design criteria: navigation, download speed, personalization, ease of use, and accessibility of commerce

sites. The objective was to find which criteria is most relevant to success in web design and if gender plays a role. Results showed that, navigation and ease of use were the most important feats; whereas, personalization and customization were least important. Female participants gave more emphasis on of these web usability criteria than males (Kortum & Bangor, 2013; Ojugo & Oyemade, 2021).

Orfanour et al., (2015) investigated the views of users on the relative significance of site design in 6-distinctive areas: financial, e-business, education, government, medical, and commerce. Some feats were important for all sites; Some sites were only ranked high for particular type of sites. Educational and Medical websites prefer comprehensiveness of data; while, other websites do not (Orfanou et al., 2015).

Ojugo and Otakore studied webometric as the experience and convenience level of users who interact with a web-based systems. It scores vital aspects of the website based on certain criteria. Thus, a site's architecture and design must reshape/refocus a user's image while satisfying user's quest about institution. They investigated website usability based on criteria that describes academic sites usability focusing on Federal University of Petroleum Resources Effurun. Result showed strengths and gaps redesigned for greater visibility. Its strength in architecture, design and contents; While, the site struggled to ensure effective search, navigation, design and others. Findings suggest that the FUPRE websites is lacking in various usability areas (Ojugo & Otakore, 2018b, 2020c; Ojugo & Yoro, 2020).

Emordi et al. (2023) also investigated the usability of selected Nigerian Universities website using the expert review guideline, and focusing on the Dennis Osadebay Varsity Anwai-Asaba. The results achieved were also compared for each criterion on staff usability of academic website. Result showed common strengths and gaps vis-a-vis unique strengths and gaps. Most academic sites successfully ensured that trust/credibility, and homepages received highest scores. While, suggesting that even top-ranked selected academic sites in Nigeria lacked in areas of search (Emordi et al., 2023; Ojugo & Eboka, 2018a, 2018c).

Xing et al. (2004) used investigated web contents via Microsoft Usability Guidelines and focused on 2 kinds of user, customers and investors. They researched on four sectors: online bookstores, automobile manufacturers, airlines and car rental agencies. Result stated that content is the most important to ease use (Xing & Shen, 2004). Also, Tullis et al. (2004) discussed impact of 6-design issues (content, navigation, download speed, personalization, security, availability and accessibility) using 2-users to evaluate 200-websites. They took 40-sites from portals, retails, entertainment, news media, and financial services. Results show that security and customization did not play a role in website's usability but the rest of them did (Tullis & Stetson, 2004).

Divayana (2021) used a 2-factor model design and evaluation on CNN's site. The hygiene factor makes site useable and avoid user dissatisfaction; while, motivator factor enhances user satisfaction. Though, absence of it may not cause dissatisfaction. Study showed hygiene factors include: technical, navigation, privacy and security systems; While, motivator factors include: enjoyment, credibility and cognitive outcome of the websites (Divayana, 2021). Thus, 86% of all participants believed that website type affects how we judge this (Malasowe et al., 2023).

1.2 Study Objectives

A critical analysis of the existing system unveils we wish to investigate the following (Akazue et al., 2022; Oyemade et al., 2016):

1. Evaluate and compare the University of Delta website result and ranking based on the Usability Expert Review guidelines.
2. Interrogate appropriate rating scale to aid user perception for academic, informative purposes.
3. Display individual result for the website's criteria like design process, architecture, navigation, hardware/software etc.
4. Finding common strengths and gaps in relation to review guidelines.

2. *MATERIALS AND METHODS*

2.1. The Adopted Research Instrument

The criteria for evaluating the usability of educational websites were constructed from guidelines on Usability Expert Review as retrieved and is available online via [web]: www.userfocus.co.uk/resources/guidelines.html; And agrees with (Ojugo, Aghware, et al., 2015a; Ojugo & Eboka, 2014, 2021; Okobah & Ojugo, 2018). Guideline scores a website based on 9-criteria. It has 20-heuristics to evaluate the usability of home pages, 44-heuristics on how well a web site supports a user's tasks, 29-heuristics on navigation and information architecture, 23-heuristics on data entry, 13-heuristics on trust and credibility, 23-heuristics on writing and content quality, 38-heuristics on page layout and visual design, 20-heuristics on search and 37-heuristics on help support, feedback and error tolerance. A total of 247 guidelines is scored to evaluate a website's usability.

2.2. Data Collection / Questionnaire Used

There are about 123-rules in the checklist that is scored to evaluate a website's usability. These were used in developing and deploying a 5-likert format questionnaire for the study. It will guide both experts and non-experts in observance of the website along with filling out the questionnaire (Ojugo & Eboka, 2020b; Ojugo & Yoro, 2013, 2021b). A ***total*** of 40-students were used, chosen from a variety of Departments in the University of Delta Agbor.

The questionnaire has 2-parts, with part-1 on demographics; while ***part-2*** consists of 6-items describing the extent of a participants' awareness of academic website usability with support for both academic and informative purposes. We adopt 5-likert value of strongly-agree (5), agree (4), undecided (3), disagree (2), and strongly disagree (1) respectively. For the analysis, all negatively worded items were reversed so a higher numbered response on the Likert scale would represent positive attitudes (Ojugo & Ekurume, 2021b, 2021a).

3.3. Selected Academic Website

Academic institutions were amongst the early developers of websites to present themselves on the Internet. However, the aim of their websites differed over time due to technological advances, and the increasing number of Internet users. The site in focus is the University of Delta Agbor website with uniform resource locator (URL) and domain name as: www.unidel.edu.ng.

2.3. Procedure and Analytics

The review guideline seeks to score each site with a positive or negative value. In each checklist, if guideline complies with a site – we rate a +1; If it does not comply, we rate a -1; If, we are undecided as to its compliance, we rate a 0. Guidelines are context specific, and not all applicable to review for academic website. Thus, some were kept blank and the graph result eases comparison of the variety of feats of interest grouped into strengths and gaps. This analysis enables us know the feats to focus on, to enhance a user's experience. We thus, analyse the factors a site wishes to address via these criteria: (1) homepage, (2) task orientation, (3) navigation, (4) forms or data entry, (5) trust/credibility, (6) writing and content quality, (7) page layout / visual design, (8) search usability, and (9) help and error tolerance.

3. RESULT FINDINGS & DISCUSSION

3.1. Performance Evaluation

Leveraging on (Aghware et al., 2023b, 2023a; Okonta et al., 2013, 2014; Wemembu et al., 2014) – Table 1 details the complete features for the UniDEL academic website with resulting figures 1 to 5. Figure 1 shows that 45% of participants disagrees that design feats does not meet the required website usability criteria level that will aid user experience satisfaction and convenience as the user navigates the site. Figure 2 shows 52% of participants agree website meets trust and credibility criteria as info retrieved is up-to-date and can be trusted.

Figure 3 shows about 71% of participants disagrees the website meets the navigation criteria to guarantee an increased level of user satisfaction as the user traverses the pages.

Figure 4 shows that about 60% of participants disagrees that the site meets the hardware and software needs; While, figure 5 shows 60% of participants disagrees that the site meets architecture and organization needs for an increased level of user satisfaction as the user goes through the pages of the website.

Table 1: Academic Usability Attributes for the UniDEL Academic Website Evaluation

Site Usability Review Guide	SD	D	U	A	SA
Home-Page Usage	11	65	11	3	10
Design Usability Process	24	45	4	16	11
Trust and Creditbility	1	22	12	52	13
Navigation and Links	19	71	3	8	1
Architecture / Organisation	9	60	2	18	11
Hardware / Software Needs	15	55	12	8	10
Content Quality	23	34	20	13	10
Help, search and Error	30	35	6	22	7

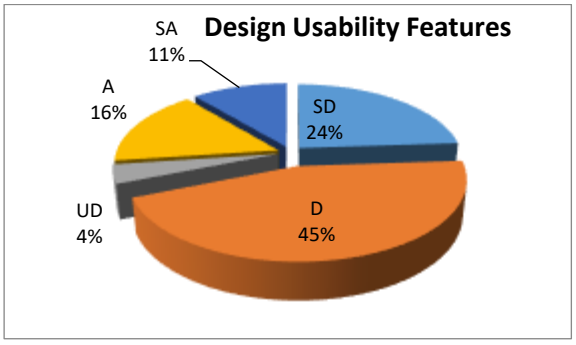

Figure 1: Design Usability Features

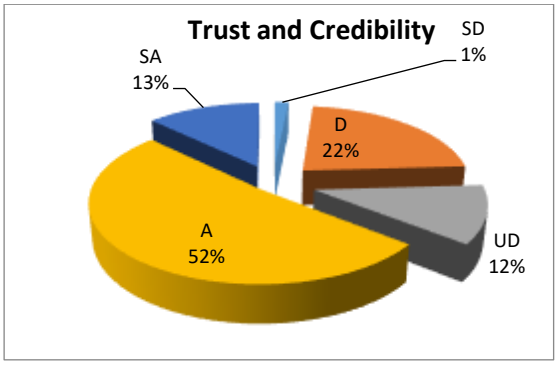

Figure 2: Trust and Credibility Usability

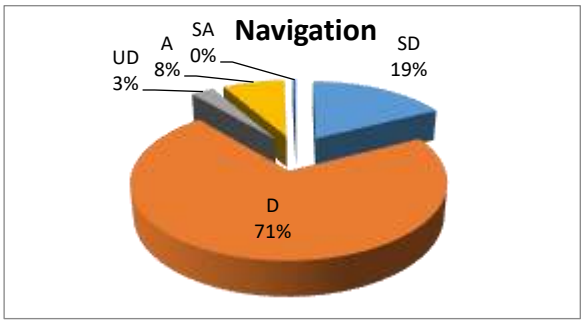

Figure 3. Navigation Criteria

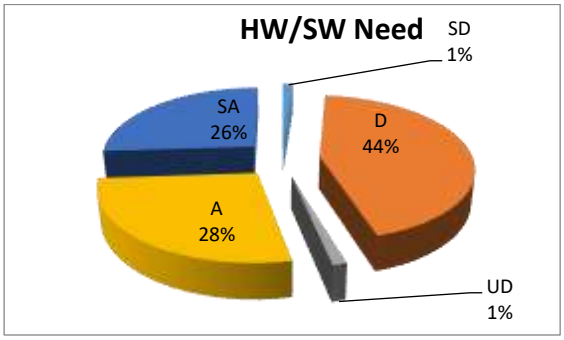

Figure 4: Hardware and Software Needs

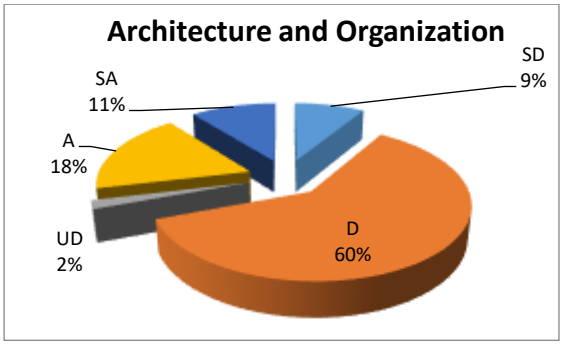

Figure 5. Architecture and Organization

3.2. Common Strengths

Some common strengths of the UniDEL academic website alongside those selected websites (Ojugo & Eboka, 2018b; Ojugo & Nwankwo, 2021; Ojugo & Otakore, 2020b) are as follows:

1. Homepage usability: Some universities websites failed to address the guidelines issues. Only 3-of-the-universities stated their value proposition in the home page with a tagline or welcome blurb, like: UI, Covenant and UNN shows a tagline in the sliding picture of the home page.
2. Task orientation: Only 2 university sites successfully kept their sites requiring of user, a minimal scroll and click activity.

Moreover, only 2 university websites use graphs to describe numerical values rather than data charts. Display of work flow is not shown in any websites except for one. Only 2 university websites have included the privacy policy in their website.

3. Navigation: Navigation should be broad and shallow with many items on a menu; But, most websites did not follow this rule. The sitemap providing an overview of the site's content is not available in any of the university website. Navigation-only pages (such as the home page) can be viewed without scrolling from, in none of these websites.
4. Data entry: Fields on forms contain hints, examples or answers to demonstrate the expected input. Also, only one university website got positive score regarding the fact that, pull-down menus, radio buttons and check boxes are preferred more than text fields on the forms.
5. Trust/Credibility: It could not be traced or found in any of the university websites, an expert acknowledgment on the sites; Though, all sites provide online contact options for users that need or require assistance.
6. Writing and content quality: 6 university websites have been found to prefer using bulleted and numbered lists in preference to narrative text. Also, 6 websites got positive score for using headings and sub-headings and short paragraphs to make pages are quick to scan.
7. Page layout and visual design: Only 6 university websites followed the guideline of confirming that items that are not clickable do not have characteristics that suggest that they are. None of the university website made their pages formatted for printing, or had print icon that suggests its print friendly. 3 websites had colors that do not work well together as mentioned earlier.
8. Search usability: Only 3 university websites managed to get a positive score for providing search results that are clear, useful and ranked by relevance. 2-of-the-8 websites have search results pages that clearly show how many results were retrieved, and the number of results per page can be configured by the user.
9. Help, feedback and error tolerance: 4 university website has received a positive point for having FAQ or on-line help which provides step-by-step instructions to help users. None of the university had a customized 404 pages, which includes tips on how to find the missing page and links to “Home”.

3.3. Common Gaps

Some common gaps of UniDEL’s site in relation to the selected websites (Ojugo & Yoro, 2021a; Oladele et al., 2024) are:

1. Homepage usability: Some university websites failed to adopt the guidelines which were followed by most others. 3 websites failed to address the issue of grouping all corporate information in one distinct area. For example, with UniLag and UniPort – membership and Partner's Activism should be in “About Us” section and not on the home page. Another weakness found between these websites is that the navigation choices are not ordered in the most logical or task-oriented manner. Some university websites also have 2 navigation bars, one at the beginning and the other one on the left which seems unnecessary and confusing for users.
2. Task orientation: 4-sites had irrelevant, unnecessary and distracting information in their websites. Users do not need to remember information from place to place in most websites except for two.
3. Navigation: 3 university websites failed to use labels to categorize and accurately describe information in that category.
4. Forms and Data entry: 2 university sites did not clearly distinguish between “required” and “optional” fields on the online admission forms. In one of the websites, the required fields are not marked at first but if you submit without

filling them up then those fields will show * beside them.

5. Trust/Credibility: 3-of-the-10 sites had typos and spelling mistakes. UniLag in its original links redirects users to their new site. Also website admission requirement in the navigation bar is wrongly spelt.
6. Writing/Content quality: 4 university sites failed to use content specifically created for the website, some did not clearly label their pages with a descriptive and useful title that makes sense as a bookmark. Also, 3 of the websites failed to use words, phrases and concepts that users are familiar with. UniLAG website used words such as Academic Rigor (not known by typical users).
7. Layout: 2-websites had problem with her functionality buttons that looks clickable, and controls that are obvious from labels.
8. Search usability: 2 university websites did not have a search box long enough to handle common query lengths; While, some university website search box were too small and looks like only one word will fit in that box.
9. Help, feedback and error: 7 websites have a loading problem with pages as quickly. The UniPort site takes more than 5-secs to load. When giving instructions, pages tell users what to do rather than what to avoid doing. Found in all sites except 1.

3.4. Overall Usability Performance

The University of Delta Agbor is ranked: www.webometrics.info/en/Africa/Nigeria?__cf_chl_tk=jWDJ.uspc5fMLaSyZYIBqd.rttzVq8OXdfBr7s7l7WU-1706370030-0-gaNycGzNDTs) as in Table 2.

Thus, figure 1 unveils that:

1. **University of Ibadan** shows overall rate of over 92% with above 82% in 3-criteria scores for homepage, writing and content quality, trust/credibility.
2. **University of Lagos Akoka** show overall rating of above 88% with above 75% in home page, writing and content quality, trust and credibility.
3. **University of Nigeria Nsukka** shows an overall rating of above 86% with over 74% in home page, writing and content quality, trust and credibility.
4. **University of Port-Harcourt** shows an overall rating of above 85% with over 69% in home page, writing and content quality, trust and credibility.
5. **Covenant University Ota** shows overall rating of above 79% with above 70% also in home page, writing and content quality, trust and credibility.
6. **Obafemi Awolowo University Ife** shows overall ranking of above 77% with above 70% score in home page, writing and content quality, trust and credibility.
7. **Ladoke Akintola University of Tech.** show overall rating of above 76% with over 61% in home page, writing and content quality, trust and credibility.
8. **Ahmadu Bello University** show overall rating of above 72% with over 56% in home page, writing and content quality, trust and credibility.
9. **Federal University of Tech Akure** show overall rating of above 71% with over 51% in home page, writing and content quality, trust and credibility.
10. **University of Delta Agbor** as the case in focus show an overall rating of less than 20% with less than 12% in home page, content, credibility and trust. earch usability had the poorest score.

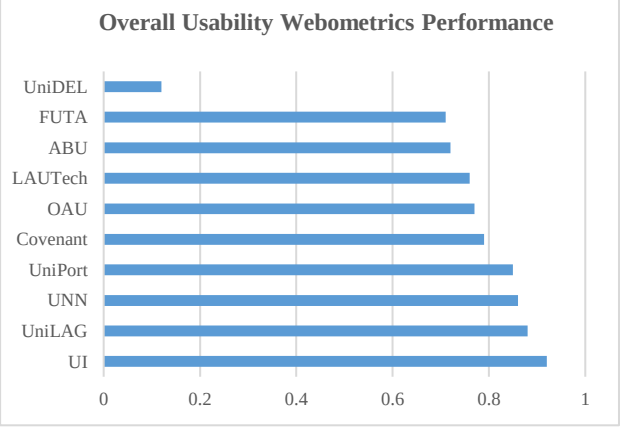

Figure 1. Overall Usability Performance for UniDEL against selected Academic websites

Table 2: Overall Relative Score of Ranked Universities Websites' Usability by WRU

World Ranking	Nigeria Ranking	Varsity Name (Abbrev.)	Relative Score (0 -1)
1138	1	UI	0.92615
1293	2	UniLAG	0.88322
1381	3	UNN	0.86891
1402	4	UniPort	0.85720
1457	5	Covenant	0.79818
1543	6	OAU	0.77332
1938	7	LAUTech	0.76201
1960	8	ABU-Zaria	0.72092
2079	9	FUTA	0.71982
14493	141	UniDEL	0.12084

The importance of UniDEL Agbor – as one of the four (4) State-owned varsities and manpower developer in Delta State cannot be over-emphasized. It is become critical, to first make known usability criteria to all UniDEL stakeholders (management, staff and students) as an effective means to engage and promote the university's position among her peers. Thus, the ICT unit must be poised to enhance UniDEL's website quality and usability as in figure 1 and 2 respectively.

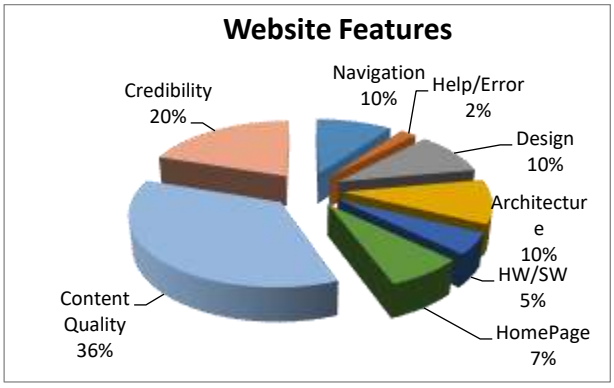

Figure 1. Overall Usability for UniDEL

Figure 2. Quality feats of UniDEL website

This will in turn increase its footprint and webometrics value, and improve its visibility on World University's Ranking. To achieve this, UniDEL must motivate her staff to have greater online presence (with high impact scholar publications) that reflects accurately their activities so as to promote the varsity's position in world ranking and webometrics ranking also (Ojugo et al., 2013, 2021, 2023; Ojugo, Eboka, et al., 2015a).

4. CONCLUSION

Websites now play prominent roles in education and training as millions of users visit them, searching for relevant data to meet their various research needs. The FUPRE website also plays key role in the interaction between students, instructors, other staff and administration. Emergence and challenges in university ranking has made usability a critical feat in qualitative assessment – ass the quality of varsity's site influences its whole ranking. It will help students make informed comparative choice of varsities to study in. The ranking compares universities across 4-broad interest to prospective student: student employability, international view, teaching and research (Ojugo, Aghware, et al., 2015b; Ojugo, Oyemade, et al., 2015; Ojugo & Eboka, 2020a; Ojugo & Otakore, 2020a; Ojugo & Yoro, 2020).

4-areas are assessed using 4-indicators with different percentage weight. Some indicators use 'hard' data; while, others employ major global survey like: (a) academic reputation of varsity (40%), (b) article citations per faculty

member (20%), (c) student-faculty standard ratio (20%), (d) international faculty ratio (5%), (e) International student ratio (5%), and (f) employer reputation (5%).

Web presence is often a trustworthy mirror that avails the developer or client of positive feedbacks and direct relevance to a university ranking. A university that wishes to improve its position must enrich her website. This importance is seen both in university ranking criteria and website ranking, because there are both direct and indirect relevance between these two items.

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