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A comparative analysis of usability and visibility of websites of universities in Africa

by

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DECLARATION

I, **Hans-Randy Masamba**, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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ABSTRACT

The increasing significance of a digital presence for educational institutions has necessitated the enhancement of university websites. This study addresses the dual challenge of usability and visibility, which are critical for attracting and retaining users, yet often deficient in African university websites.

The research aimed to investigate the relationship between usability and visibility in African university websites and to provide recommendations to improve both aspects without compromising either one.

A quantitative research method was employed, involving usability testing and visibility evaluation of selected African university websites. Forty-four participants tested the usability through an online questionnaire, and websites were ranked based on their user-friendliness. Visibility was assessed using the Weideman (2009) visibility model, and both rankings were statistically analysed to identify any correlation.

The study identified common usability issues such as navigation and readability problems, which were consistent with previous research. Visibility varied, with some websites excelling in either usability or visibility but rarely both. The analysis revealed no significant correlation between usability and visibility rankings in the sample.

The findings suggest that improving usability does not necessarily enhance visibility and vice versa. This highlights the need for a balanced approach in website design that considers both factors independently.

This study contributes to the limited research on the interplay between usability and visibility in African university websites. It provides empirical evidence and practical insights for developing websites that are both user-friendly and search engine optimized, addressing a significant gap in the literature.

Keywords: usability, visibility, website evaluation, comparative analysis, African universities, university websites

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TABLE OF CONTENTS

LIST OF TABLES

LISTE OF FIGURES

GLOSSARY

Abbreviation	Explanation
HCI	Human Computer Interaction
HTML	Hypertext Markup Language
SEO	Search Engine Optimisation
UCD	User Centred Design
UI	User Interface

Terms	Definition
Age of document	Indicates the duration a document has been part of a webpage.
Age of link	Indicates the duration a link has been included on a webpage.
Anchor text	The descriptive text embedded within a hyperlink on a webpage.
Banner advertising	A digital marketing technique that showcases ads at the top of a webpage.
Black hat techniques	Involves employing techniques where a webpage appears differently to users than to search engine crawlers, aiming to artificially boost its ranking.
Body	The primary section of a webpage.
Crawler	A software program that explores the internet and collects information about websites.
Description metatag	An HTML tag that used to describe of the content of a webpage.
Doorway page	A webpage strategically designed to attain high rankings from web crawlers, yet its main purpose is to direct human users to another page featuring content that is user-friendly.
Effectiveness	An aspect of usability that assesses how well systems perform the tasks they are designed for.
Efficiency	An aspect of usability referring to the ability of interactive systems to assist end-users in completing tasks.

External link	Refers to a hyperlink which connects webpages from different websites.
H1 tag	A heading tag on a webpage indicating the importance of text.
HCI	Human Computer Interaction. A discipline focused on designing user-friendly and interactive computer-based systems.
Hyperlink	A link inserted on a webpage that, when clicked, redirects the user to a different location on the same website or to another web page.
HTML	Hypertext markup Language. A document language used for creating webpages.
Inlinks/backlinks	Hyperlinks originating from external websites and directing towards the one in question.
JavaScript	A programming language used to add interactivity to websites.
Keyword spamdexing	The act of duplicating keywords within the metatag segment of a webpage.
Keyword metatag	A metatag that compiles pertinent keywords users might input when conducting searches on a search engine.
Learnability	An attribute of usability that defines how easy systems are to learn to get to use them.
Memorability	An attribute of usability which speaks to how systems help users remember how to perform tasks and activities.
Metatag	An element used to describe other elements of a web page.
Navigation	The ability to move from one webpage to another.
Outlinks	Hyperlinks that link website A to website B.
Robot.txt	A file in the root directory of a website that prevents search engine crawlers from indexing specified webpages.
Search engine	A service that aids users in discovering pertinent information on the internet.

SEO	A technique that involves adjusting a website in order to achieve a higher ranking on search engines.
Sitemap	A file containing a depiction of a website's structure.
Spamdexing	The implementation of search engine ranking tactics that impact the quality of results displayed by search engines.
Title metatag	An HTML tag used to define the title of the website.
UCD	User Centred Design. Refers to a software development approach that prioritises the user in the design process.
UI	User Interface. Refers to the visual component of a system that enables interaction between the user and the system.
Usability	A term describing how user-friendly a website is.
User experience	Refers to how a user feels about using a product, system, or website.
Visibility	The degree of accessibility for a search engine crawler to locate and index a webpage.
Web page	An HTML document that is part of a website.
Website	A collection of related webpages under the same domain name.
White hat techniques	Involves employing techniques where a webpage does not appear differently to users than to search engine crawlers, i.e. not aimed to artificially boost its ranking.

CHAPTER ONE – INTRODUCTION

In this chapter, the researcher delves into the focal point of the study, introducing the background, research problem, aim, questions, and objectives. The narrative unfolds to provide an insightful overview of the anticipated research process. Ultimately, the chapter sets the stage by outlining the structure and key elements of the ensuing report.

1.1 Introduction and Background

In this digital age, establishing a robust online presence is integral to an organisation's success. The creation of a website has become a cornerstone for businesses, offering multifaceted advantages that not only align with their objectives but also confer a competitive edge (Dabrowski *et al.*, 2014). Websites serve as dynamic platforms, allowing businesses to showcase products, enhance visibility to potential clients, build credibility, extend reach beyond local confines, and fulfil various other strategic goals. This digital footprint assumes paramount importance in marketing, particularly within the educational domain (Weideman, 2014).

Educational institutions, globally, have harnessed the power of websites for diverse purposes. From fulfilling organisational objectives such as promoting educational competencies and attracting prospective students to supporting learning activities, universities employ websites to navigate the evolving landscape of education (Lwoga, 2012). Most universities worldwide facilitate access to Learning Management Systems (LMSs) and digital libraries through their websites, aiming to provide optimal support for student learning (Aldiab *et al.*, 2019). The significance of digital libraries has grown steadily over the years (Valenti, 2019; Inal, 2018; Duncan *et al.*, 2015; Pant, 2015).

The utilisation of university digital libraries corresponds directly to the surge in demand and supply of online articles, materials, books, and services (Weideman, 2020; George, 2005). Students increasingly favour digital libraries over on-site services due to the enhanced accessibility of information (Inal, 2018). The efficacy of a university digital library hinges on its content, usability, and visibility (Valenti, 2019; Dabrowski *et al.*, 2014). Qudah (2016) highlights that student-content interaction significantly influences academic performance, emphasising the need to prioritise these elements for universities to deliver high-quality services.

It was predicted, about two decades ago, that the use of the internet would have a major impact on learning. (Wesson, 2002). In the academic realm, there is a consensus that web

usability and visibility significantly contribute to the success of a university (Valenti, 2019). Website visibility, denoting its discoverability by search engines, holds particular importance for universities as it influences the likelihood of internet users encountering references to their website. Simultaneously, web usability endeavours to enhance the user experience, aiming to transform internet users into registered students. In essence, while a high visibility score boosts web traffic, a user-friendly university website ensures user satisfaction and encourages visitors to transition from casual browsers to enrolled students.

Given the website's role as a marketing tool converting visitors into students, it becomes imperative that its design is not only user-friendly but also search engine friendly (Weideman, 2011; Esmeria *et al.*, 2017). This dual approach reduces or eliminates usability issues, consequently improving the visibility score. A user-friendly website attracts more visitors, enhancing interactions with university staff and often resulting in increased revenue (Adhiambo *et al.*, 2017; Hasan *et al.*, 2013). Conversely, a poorly designed website can adversely impact student experiences and, consequently, revenue. Similarly, a lack of visibility constrains the ability to attract students online, limiting revenue potential (Wang *et al.*, 2014).

Prior studies by Abuqaddom *et al.* (2019), Inal (2018), McCoy *et al.* (2018), Park (2018), Bhandari (2017), Peker *et al.* (2016), Wang *et al.* (2014), Weideman (2014) and Caglar *et al.* (2012) have identified prevalent usability and/or visibility issues on university websites. While most research has focused on one of these characteristics, only a few have endeavoured to determine if there is a connection between them. This study is particularly noteworthy as it is believed to be among the first to comprehensively assess, measure the visibility and usability of a sample of African university websites.

Therefore, the research aimed to aid African universities in identifying areas where usability is lacking, facilitating improvements, and elevating their web visibility score. This endeavour sought to streamline the process for universities to develop more user-friendly web pages that are also better indexed by search engines.

1.2 Background to research problem

In previous investigations, certain universities have been found to grapple with poorly designed websites, experiencing deficiencies in both usability and visibility. These shortcomings, as highlighted in studies by Wang *et al.* (2014), Eidimtas *et al.* (2012) and Weideman (2002), contribute to a significant challenge wherein universities struggle to attract and convert website visitors into registered students. The repercussions extend beyond mere website functionality, affecting the universities' revenue, reputation, and even influencing the academic achievements of their students (Muhammad *et al.*, 2021). Recognising the pivotal role that user-friendly and search engine-optimised websites play, it is evident that universities stand to gain by enhancing their web pages to align with contemporary digital standards.

Observations of numerous university websites reveal prevalent issues in both visibility to search engines and usability for human users (Muhammad *et al.*, 2021; Silvis *et al.*, 2018; Peker *et al.*, 2016; Weideman, 2014). This dual challenge manifests in difficulties for students attempting to locate specific webpages, navigate through site content, and access relevant information (Lomness *et al.*, 2021; Simui *et al.*, 2017). The cumulative effect is a potential loss of clientele and financial challenges for the affected universities.

Furthermore, Peker *et al.* (2016) indicated a strong correlation between usability and visibility in the design of Turkish university websites. What remained uncertain was whether the visibility challenges identified on African university websites are a consequence of underlying issues in usability. Hence, the research problem addressed in this project revolved around the absence of empirical evidence establishing a clear relationship between web usability and web visibility for African university websites.

This research sought to fill this gap by investigating whether conflicting elements in usability and visibility exist in the design of selected university websites in Africa. The goal was to provide insights and guidance on improving usability without compromising visibility, or vice versa. The pursuit of this empirical evidence was critical for shaping strategies that align with the unique digital landscape of African university websites, ensuring they effectively cater to the needs of both users and search engines.

1.3 Research problem

Despite the importance of a search-friendly and user-friendly university websites, usability problems and visibility issues are still found in many university websites (Muhammad *et al.*, 2021; Silvis *et al.*, 2018; Peker *et al.*, 2016; Weideman 2014). Failing to address these issues may result in students interacting less with the website contents (Lomness *et al.*, 2021; Simui *et al.*, 2017). Currently, it is not known whether the visibility issues found in African university websites are the results of low level of usability. Thus, there is a need to investigate if conflicting usability and visibility elements exist in the design of African university websites and provide recommendations and guidelines on how to improve the level of usability without negatively affecting the level of visibility, or vice versa.

1.4 Aim, Objectives, Research questions

1.4.1 Aim

This research aimed to explore and understand the interplay between usability and visibility within a selected sample of African university websites.

1.4.2 Objectives

Aligned with the aim of this research, the objectives were structured as follows:

1.4.2.1 Explore and identify the top-performing African universities using current academic rankings from reputable academic ranking institutions.

1.4.2.2 Conduct usability testing for the selected African universities to assess the user-friendliness of their websites and rank them accordingly.

1.4.2.3 Evaluate and determine the visibility ranking scores for the selected African university websites according to an academic model.

1.4.2.4 Identify and employ a suitable tool for assessing the correlation between the usability and visibility of the selected African university websites.

1.4.3 Research questions

In accordance with the purpose of the research, the main research question of the study was as follows:

1.4.3.1 What is the relationship between the usability and visibility of the selected African university websites?

In pursuit of the research objectives, the following sub-questions were formulated:

1.4.3.1.1   Which African universities currently hold top positions based on academic rankings from recognised academic ranking institutions?

1.4.3.1.2   How does the usability of the websites of the selected African universities fare, as assessed through usability testing?

1.4.3.1.3   What are the visibility ranking scores of the selected African university websites?

1.4.3.1.4   Which tool can be used to determine the correlation between the usability and visibility of the selected African university websites?

1.4.4 Delineation of the research

This research is centred on a sample of African university websites, focusing exclusively on information obtained from the specified participants and the visibility investigation done by the researcher.

1.4.5 Structure of the thesis

The structure of this research is as follows:

1.4.5.1 **Chapter one:** This chapter provides an introduction to the topic, addressing the research problem, aim, objectives, questions, and the scope of the research.

1.4.5.2 **Chapter two:** This chapter Literature review, exploring the usability and visibility in the context of tertiary educational websites.

1.4.5.3 **Chapter three:** This chapter describes the methodology and approach employed to achieve the aim of the research project, which is to determine whether there is a correlation between the usability and visibility of a sample of African university websites.

1.4.5.4 **Chapter four:** This chapter presents, interprets and discusses the results obtained through the usability testing and visibility investigation.

1.4.5.5 **Chapter five:** This chapter provides a conclusion of findings in alignment with the aim, questions and objectives of the research.

1.5 Summary

Chapter one introduced the topic, outlined the research components, and explained the significance of the study. The following chapter delves into the current literature on usability and visibility of university websites.

CHAPTER TWO – LITERATURE REVIEW

This section offers a comprehensive examination of the existing literature concerning the usability and visibility of tertiary educational websites. The exploration involved consulting prominent library databases like Emerald, Science Direct, and IEEE Xplore. The search criteria prioritised recent publications, specifically journal articles, book sections, and conference papers. Additionally, seminal papers, regardless of their publication date, were incorporated to enrich the study.

The chapter not only delves into the essential concepts pertinent to this research but also conducts a thorough review of related studies within the field of interest. This review aims to identify gaps in the existing body of knowledge.

2.1 Human Computer Interaction

Within the realm of Human-Computer Interaction (HCI), a subset of information systems, the focus lies in designing user-friendly computer-based systems for human interaction (Agrawal *et al.*, 2010). The design of effective User Interfaces (UI) stands out as a critical aspect of HCI, as emphasised by Punchoojit *et al.* (2017). Notably, Salvendy (2012) underscores the complexity of designing an effective UI, requiring a nuanced understanding of disciplines like graphic design, software engineering, sociological contexts, and the end-users' physical and cognitive capabilities. The rapid technological advancements further necessitate innovative processes for creative design explorations (Hye *et al.*, 2018; Thies *et al.*, 2015).

2.2 User Centred Design

User-Centred Design (UCD), an interactive software development method, positions the user at the core of the design process to enhance system user-interfaces and provide a superior experience (Huang *et al.*, 2019; Calp *et al.*, 2015; Hidayah *et al.*, 2015; Van Riel, 2003). This approach, extending into areas such as user safety, ethics, sustainability, and return on investment, builds a relationship of trust between organisations and customers. The iterative UCD process, consisting of stages such as Research Analysis, Concept, Design, Test, and Iterate Design, ensures a focus on user satisfaction (Valenti, 2019).
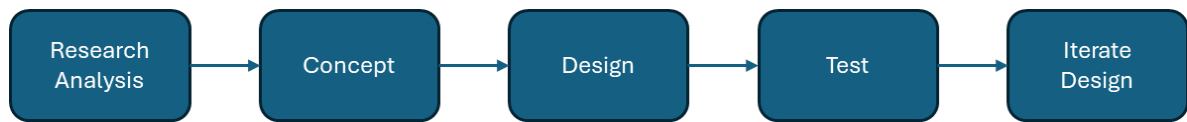
Figure 2.1: UCD process consisting of four stages

2.2.1 Research analysis

In the research analysis phase, business analysts engage with project stakeholders to discern functional and non-functional requirements.

2.2.2 Concept

The second phase of the process entails understanding how the various system components can be integrated to allow designers to design the overall system with great precision.

2.2.3 Design

The design step entails designing the complete system and removing design flaws. The design phase also includes the creation of safe interactive systems to limit the chance of human and business faults occurring. To allow end-users to reconsider or validate their actions, systems should ideally have an "Undo" and data validation capability.

2.2.4 Test

Usability and user acceptance testing are carried out during the testing phase.

2.2.5 Iterate design

Iterating design until clients are pleased is the final stage of the UCD process. UCD is one technique to software development that can be used to create systems with a high degree of usability (Huang *et al.*, 2019). As a result, using UCD may ensure both a rise in profit and an improvement in customer pleasure.

2.3 Website usability

Effective usability, a paramount quality criterion, gauges how easily a system can be used from the end-user's perspective (Silvis *et al.*, 2018; Nielsen, 2012). For university websites, usability extends to users feeling comfortable and enjoying the interaction with application and registration procedures, as well as accessing learning materials. The six facets of usability — effectiveness, efficiency, security, utility, learnability, and memorability — collectively contribute to creating a user-friendly system (Anna, 2018; Lapin, 2014; Ahmed e*t al.*, 2009; Nielsen, 1999).

2.3.1 Effectiveness

Effectiveness characterises how well proficient systems fulfil their intended tasks (Silvis *et al.*, 2018). An effective university website, for instance, can equip potential students with the necessary information for tasks such as registration, application, and topic selection.

2.3.2 Efficiency

Efficiency in interactive systems refers to their ability to assist end-users in performing tasks seamlessly (Anna, 2018). A university website demonstrates efficiency when it enables users to accomplish tasks like submitting assignments, accessing scholarly materials, and tracking applications with ease.

2.3.3 Security

Security pertains to a system's capability to facilitate user recovery from errors (Lapin, 2014). A secure university website allows students to rectify inaccuracies, such as entering incorrect personal information during registration or uploading the wrong assignment copy.

2.3.4 Utility

Utility signifies the extent to which systems provide the necessary functionality to aid users in fulfilling their responsibilities (Nielsen, 1999). A university website with high utility incorporates software tools like SafeAssign or Turnitin, supporting students in academic writing and research.

2.3.5 Learnability

Learnability addresses how systems encourage satisfaction and are easy to understand (Ahmed *et al.*, 2009). A system promoting learnability allows users to engage in activities and tasks with minimal effort.

2.3.6 Memorability

Memorability focuses on how technologies assist users in recalling how to complete tasks and activities (Anna, 2018). Systems with high memorability employ meaningful labels, icons, menus, and menu items to aid users in remembering the sequence of operations (Silvis *et al.*, 2018).

For universities aiming to enhance the usability of their websites, attract a broader audience, and potentially convert them into registered students, consideration of all these design aspects is imperative.

2.4 Previous studies on usability of university websites

This section delves into the existing body of literature that has explored the usability of university websites, tracing the evolution of research focus from early studies centred on the library aspect to a broader perspective encompassing the entire university website.

The initial wave of studies, primarily concentrated on the usability of higher education websites, homed in on the library component. Peker *et al.* (2016) notes that early investigations, such as those by VandeCreek (2005) and Battleson *et al.* (2001), emphasised the crucial role of usability testing in ensuring the effectiveness and usability of university library websites. These studies utilised formal usability testing, focus group sessions, questionnaires, and user testing to evaluate the usability of library websites, revealing valuable insights. However, some of these methods were deemed resource-intensive and time-consuming, prompting the need for more efficient approaches.

In the last two decades, there has been a noticeable shift in the focus of usability studies, moving from universities' library web pages to a broader exploration of entire university websites. Alexander (2015), cited in Peker *et al.* (2016), is credited with conducting one of the pioneering usability studies on universities' websites. The study involved prospective students

from three different countries and identified common usability issues, including problems with interface design, content, and information architecture.

Recent studies, exemplified by Peker *et al.* (2016) and Mahmut *et al.* (2011), have adopted a more diverse set of usability evaluation techniques. Mahmut *et al.* (2011) employed post-test questionnaires, heuristic evaluation, and remote usability testing to identify problems on the university of Boğaziçi's website. Similarly, Peker *et al.* (2016) explored the correlation between usability levels and web presence in Turkish university websites using user testing and questionnaires. This study ranked university websites based on usability and revealed a strong correlation between usability and web presence. Mukanda *et al*. (2022) and Oduor *et al*. (2020) performed a usability study on university websites in Kenya. Common usability issues were identified in the respective studies. This seems to indicate that university websites are still being poorly designed in terms of usability.

The unique contribution of this research lies in its exploration of the visibility and usability levels of African universities' websites, a previously uncharted territory. With an aim to assist African universities in identifying and improving areas of inadequate usability and enhancing their web visibility score, this research is poised to empower these institutions to create more user-friendly web pages that are optimally indexed by search engines.

In essence, the literature review underscores the critical importance of usability testing in ensuring the efficacy and user-friendliness of university websites. By drawing on a variety of usability measurement methods, these studies have consistently identified and addressed usability problems, providing valuable insights for website enhancement. This research, extending the discourse to the context of African universities, adds a novel dimension to the existing body of knowledge and offers practical implications for institutions seeking to enhance their online presence and user satisfaction.

2.5 Website visibility

Web visibility, a pivotal measure of online presence, gauges the ease with which a search crawler can recognise and index a webpage (Schultheiß & Lewandowski, 2021; Weideman, 2014). The factors influencing web visibility encompass both black-hat and white-hat search engine optimisation, with the latter focusing on keywords, metatags, backlinks, and more. The significance of ethical practices is underscored, as black-hat techniques carry the risk of search engine blacklisting, potentially diminishing website traffic (Lee *et al.*, 2016; Luh *et al.*, 2016; Zineddine, 2016).

The impact of web visibility on website traffic is well-established in the public domain (Wang *et al.*, 2014), and this holds true for universities as well. Papers in this domain can be broadly categorised based on their focus. Early studies delved into the correlation between the number of links in a university website and its research productivity (Yi *et al.*, 2008). Subsequent research explored factors influencing hyperlink behaviours between university websites. Yi *et al.* (2008) examined the visibility to search engines of a sample of Canadian university websites, using the AlltheWeb search engine to identify links pointing to the selected universities' websites. The study revealed a relationship between web entity usage and the quantity and quality of in-links. Weideman (2014) evaluated the visibility of homepages of a sample of UK universities, emphasising the importance of considering all website visibility elements, even though in-links carry substantial weight. The study employed freeware such as Alexa, Ranks, and Grader to measure website visibility elements incorporated into the Weideman model (Weideman, 2009). These tools were deemed reliable sources of information.

2.5.1 Search Engine Optimisation in the context of university websites

In the realm of university website visibility, the significance of search engines and effective Search Engine Optimisation (SEO) strategies cannot be overstated (Shahzad *et al.*, 2017). This subsection explores the literature surrounding the role of search engines and SEO in enhancing the visibility of university websites.

As university websites transition from traditional repositories of information to dynamic platforms for engagement, the role of search engines has evolved. Early studies, such as the one by Alexander (2015), highlighted the importance of search engine visibility in ensuring that prospective students can easily access pertinent information across university websites.

The literature reveals a spectrum of SEO techniques employed in the context of higher education. Lee *et al.* (2016) utilised a combination of the Robot.txt file, XML sitemap, removal of dead links, descriptive title tag and simplified URL structure to improve credibility and increase traffic to a university website. Park (2018) extended this exploration by employing a combination of metadata and XML sitemap for better indexing on Google. These studies underscore the intricate relationship between SEO strategies and the overall visibility of university websites.

2.5.2 Academic university rankings

Various organisations conduct university rankings, each employing a distinct algorithm that yields diverse outcomes, as illustrated in Table 2.1. These rankings serve as a means to identify the most prestigious academic institutions globally (Sugak, 2011; Thelwall, 2010).

Name	URL
Academic Ranking of World Universities	http://www.shanghairanking.com/
CWUR Top University Rankings	https://cwur.org/2019-2020.php
Ranking Web of Universities	http://www.webometrics.info/en
The World's University Rankings	https://www.timeshighereducation.com/world-university-rankings
Top Universities	https://www.topuniversities.com/
World Top 20 Project	https://worldtop20.org/global-universities

Table 2.1: Institutions doing rankings of universities

2.5.3 Visibility rankings

In the literature we find several models offering frameworks for assessing the visibility of websites, including the Binnedell model, Chambers model, Visser model, industry model, and the Weideman model (Weideman, 2009). The Weideman model introduces a scoring system that amalgamates credits assigned to the elements of the Binnedell, Chambers, industry and Visser models (Weideman, 2009). Another contemporary model, the Sullivan model (Sullivan, 2011), delineates elements for effective on-page and off-page SEO strategies; however, it is noteworthy that this model lacks a presence in academic literature and lacks empirical data to substantiate its foundations.

2.5.3.1 The Binnedell model

The Binnedell model outlines eight positive and six negative elements, as outlined in Table 2.2. Each positive factor is assigned 5 credits, while each negative element is allotted 6.66 credits.

Element	Effect	Credit earned
Descriptive, keyword-rich body text	Positive	5.0
Meaningful page title and TITLE tag	Positive	5.0
Sensible keyword placement	Positive	5.0
Manual search engine submission	Positive	5.0
Description metatag	Positive	5.0
Paid inclusion service	Positive	5.0
Paid placement service	Positive	5.0
High, valid Inlink count	Positive	5.0
		Total: 40
Excessive graphics	Negative	6.66
Use of frames	Negative	6.66
Dynamic webpages	Negative	6.66
Keywords spamming	Negative	6.66
Cloaking	Negative	6.66
Doorway pages	Negative	6.66
		Total: 40

Table 2.2: Binnedell model credit list (Weideman, 2009)

2.5.3.2 The Chambers model

The Chambers model outlines six positive and four negative elements, as outlined in Table 2.3.

Element	Effect	Credit earned
Inclusion of metatags	Most positive	14.3
Hypertext/anchor text	Positive	11.9
Prominent link popularity	Positive	9.5
Prominent domain names	Positive	7.1
Prominent headings	Positive	4.8
Prominent HTML naming conventions	Least positive	2.4
		Total: 50
Flash content	Most negative	20.0
Visible link spamming	Negative	15.0
Frames	Negative	10.0
Banner advertising	Least negative	5.0
		Total: 50

Table 2.3: Chambers model credit list (Weideman, 2009)

2.5.3.3 The Visser model

The Visser model outlines nine positive and seven negative elements, as outlined in Table 2.4.

Element	Effect	Credit earned
Keywords placement	Most positive	8.0
Keywords proximity	More positive	8.0
Keywords frequency	More positive	8.0
Keywords used in metatags	More positive	8.0
Keywords used in hypertext/anchor text	More positive	8.0
Keywords used in links	More positive	8.0
Keywords used in headings	More positive	8.0
Keywords used in domain names	Less positive	2.0
Keywords used in HTML naming conventions	Less positive	2.0
		Total: 60
Link spam	More negative	14.0
Text spam	More negative	14.0
Flash	Less negative	6.4

Frames	Less negative	6.4
Images	Less negative	6.4
JavaScript	Less negative	6.4
Videos	Less negative	6.4
		Total: 60

Table 2.4: Credit allocation that the Visser model proposes (Weideman, 2009)

2.5.3.4 The industry model

The industry model proposes twenty positive and nine negative elements, as outlined in Table 2.5 and Table 2.6.

Element	Ranking	Credit earned
Keyword use in TITLE tag	4.9	14.3
Global link popularity of site	4.4	13.6
Anchor text of inbound link	4.4	12.9
Age of site	4.1	12.1
Link popularity within internal link structure	4.0	11.4
Topical relevance of inbound links	3.9	10.7
Link popularity of site in topical community	3.9	10.0
Keyword use in body text	3.7	9.3
Global link popularity of linking site	3.6	8.6
Quality/relevance of links to external sites	3.5	7.9
Topical relationship of linking page	3.5	7.1
Rate of new inbound links to site	3.5	6.4
Relationship of body text content to keywords	3.4	5.7
Age of document	3.4	5.0
Keyword use in H1 tag	3.3	4.3
Amount of indexable text content	3.2	3.6
Age of link	3.2	2.9
Topical relationship of linking site	3.1	2.1
Text surrounding the link	3.1	1.4
Relevance of site's primary subject matter to query	3.1	0.7
		Total: 150

Table 2.5: Positive elements of the industry model (Weideman, 2009)

Element	Ranking	Credit earned
Server is often inaccessible to bots	3.8	30.0
Content is very similar or duplicate	3.6	26.7
External links to low quality/ spamdexing sites	3.6	23.3
Duplicate title/ metatags on many pages	3.3	20.0
Keyword stuffing	3.3	16.7
Participation in links schemes	3.3	13.3
Very slow server response times	2.8	10.0
Inbound links from spamdexing sites	2.1	6.7
Low level of visitors	2.1	3.3

Table 2.6: Negative elements of the industry model (Weideman, 2009)

2.5.3.5 The Weideman model

This model assigns a credit score to each element discussed in the aforementioned models.

Elements	Score
Inlinks	82.3
Body keywords	54
Hypertext/ anchor text	32.8
Metatags	27.3
TITLE tag	19.3
H1 tag	17.1
Outlinks	15.9
Age of Site	12.1
Domain names	9.1
Manual search engine submission	5
Paid inclusive service	5
Paid placement service	5
Age of document	5
HTML naming conventions	4.4
Age of links	2.9
Topical relationship of linking site	2.1
Relevance of site's primary subject matter to query	0.7

Table 2.7: Positive elements of the Weideman model (Weideman, 2009)

Elements	Score
Link spamdexing	42.3
Keyword spamdexing	37.36
Server is often inaccessible to bots	30.0
Content is very similar or duplicate	26.7
Flash	26.4
External links to low-quality/ spamdexing sites	23.3
Frames	23.04
Duplicate title/ metatags on many pages	20.0
Graphics	19.46
Very slow response times	10.0
Inbound links from spamdexing sites	6.7
Cloaking	6.66
Doorway pages	6.66
Dynamic webpages	6.66
JavaScript	6.4
Banner advertising	5.0
Low level of visitors	3.3

Table 2.8: Negative elements of the Weideman model (Weideman, 2009)

Usability and visibility in the realm of university websites have garnered scholarly attention globally, with a growing recognition of their significance in the digital age. Usability, often defined by factors such as navigation, content clarity, and user experience, stands as a cornerstone for effective online platforms (Nielsen, 1993). Concurrently, visibility, encompassing elements like search engine optimisation and online presence, emerges as a critical determinant of an institution's reach and influence (Chaffey *et al.*, 2016).

While a plethora of studies have examined the usability and visibility of websites in general, there exists a discernible gap in the specific exploration of whether there exists a correlation between the two design factors in the context of African university websites. This research holds significance for African universities, offering insights into areas where usability and visibility scores can be improved.

2.6 Summary

This literature review, sought to synthesise existing knowledge on usability and visibility while specifically addressing the dearth of research within the African higher education context. By analysing the existing body of work, this review aimed to establish a foundation for the current study and highlight avenues for further exploration in understanding the intricacies of African university websites' usability and visibility.

The information provided guided the research design and methodology, which is discussed in the next section.

CHAPTER THREE – RESEARCH DESIGN AND METHODOLOGY

This chapter delves into the comprehensive research methodology employed to investigate the relationship between the usability and visibility of African university websites. By detailing the research design, philosophy, hypotheses, approach, method, and analysis techniques, this chapter outlines the systematic and rigorous process undertaken to fulfil the purpose and objectives of the research. The chosen research approach aligns with the aim of objectively exploring the correlation between usability and visibility of a sample of African university websites. Furthermore, the quantitative approach with deductive reasoning ensured a holistic understanding of quantitative measurements, providing a well-rounded perspective on the chosen variables.

3.1 Research philosophy

Positivism was chosen as the research philosophy since the study relies on factual knowledge gathered during data collection (Earl, 2012). This aligns with the goal of objectively determining the relationship between the selected variables – usability and visibility of a sample of African university websites.

3.2 Research hypothesis

The research posits a null hypothesis (H0) suggesting no correlation between the usability and visibility of African university websites, while the alternative hypothesis (H1) asserts a significant correlation.

The null hypothesis (H0) posits that there is no correlation between the usability and visibility of African university websites, while the alternative hypothesis (H1) suggests a correlation exists. These hypotheses are formulated based on existing literature and theories, especially those exploring the relationship usability and visibility of websites.

3.3 Research approach

The deductive research approach is suitable when seeking to test the hypotheses and theories derived from prior studies (Greener, 2008). The research adopted this approach to test the theory of Peker *et al.* (2016) that there is a correlation between the usability and visibility of university websites. This research sought to test this theory within the context of African university websites. Usability testing involving 44 participants and visibility investigation were

conducted to assess the correlation between the two design factors. The same group of participants were exposed to all websites. They were selected based on their availability, computer literacy, and familiarity with university websites.

3.4 Research method

To achieve the research objectives, the quantitative method was employed. Geoff (2005) defines the quantitative research technique as output-oriented and focused with discovering factual knowledge or the reasons of a phenomenon. This approach allowed the conversion of responses collected during usability testing into comparable units for statistical analysis and ranking. Similarly, the scoring system for visibility investigation inherently involved quantitative data. The examination of the correlation between these two types of ranking was conducted using a rank correlation tool.

3.4.1 Quantitative method

The choice of employing the quantitative method stemmed from the research's inherent nature. To examine the correlation between the usability and visibility of a sample of African university websites, it was imperative to generate quantitative data from both the usability assessment and visibility evaluation (Djamba *et al.*, 2002). Consequently, both the usability assessment and visibility investigation were performed through a quantitative analysis. Participant satisfaction with the websites under scrutiny was quantified to establish a scoring system, allowing for the ranking of the websites based on these metrics. A parallel methodology was applied in the visibility investigation, employing the scoring system from the Weideman model.

3.5 Research design

The survey research method was chosen, providing a systematic framework for data collection. This method proves apt for the quantitative approach and aligned with the study's goal of exploring the relationship between usability and visibility of the selected African university websites (Kothari *et al.*, 2014; Mathiyazhagan *et al.*, 2010; Glasow, 2005; MacDonald *et al.*, 2004).

3.6 Sampling

The research used stratified and purposive sampling techniques. Stratified sampling was employed to select the African universities for testing, ensuring representation across different regions. This study focused on the top universities in three distinct African regions: North Africa, Sub-Saharan Africa, and the remaining areas of the continent. The aim was to ensure equal representation from each region. To achieve this, the researcher utilised the webometrics rankings of African university websites in March 2023. Employing a stratified sampling method, the population was then divided into the specified regions—North Africa, Sub-Saharan Africa, and the Rest of Africa. As of March 2023, the University of Cape Town emerged as the highest-ranked university in Sub-Saharan Africa. Additionally, Cairo University and Makerere University secured the top positions in North Africa and the Rest of Africa, respectively.

Purposive sampling targeted individuals familiar with university websites and experienced in using computers or related technology (Karlsson, 2008). Forty-four participants actively took part in the usability testing phase, showcasing proficiency in computer usage and a familiarity with university websites. To enable convenient remote involvement, the researcher provided links to a Google form questionnaire. Each participant was assigned tasks related to university websites. The selection criteria for participants included considerations for availability, internet access, and familiarity with university websites. The researcher prioritised professionalism, creating a trustworthy atmosphere where participants weren't compelled to disclose personal information, and no sensitive themes were implicated. Participation remained voluntary, with no financial compensation in play.

3.7 Data collection

The first phase of the data collection process centred on usability testing, where participants engaged in activities on the chosen websites and responded to a set of quantitative closed-ended, rating scale questions in an online questionnaire, thus providing quantitative data.

For the online questionnaire, Google Forms was utilised, streamlining the storage of all responses in a single repository. Leveraging the platform's capabilities, the researcher could benefit from diagrams generated based on participant responses.

The initial section of the questionnaire offered a brief description of the study, outlined the tasks to be performed on each of the selected websites, and provided explicit instructions for

questionnaire completion to prevent confusion. Only questions pertinent to the study were incorporated.

To assess website visibility, the Weideman model was employed, assigning scores based on its criteria. This model was preferred over others due to its foundation in preceding academic models (Weideman, 2009). Additionally, analysis tools such as <u>SEO Review Tools</u> and <u>Ahrefs' backlink checker</u> were used to evaluate the visibility of the selected websites. The tools provide more or else the same functionalities. The only difference is that SEO Review Tools is entirely free to use. Ahrefs offers multiple tools, however, only backlink checker is free to use.

Having inspected the university websites it became clear to the researcher that both SEO Review Tools and Ahrefs would provide some of the visibility measurements required.

The Spearman rank correlation method was chosen to scrutinise the correlation between usability and visibility of the selected African university websites. This method, ideal for analysing correlations between two ordinal variables, aligns with the approach advocated by Weideman (2011).

3.8 Data analysis

Descriptive analysis is suitable for surveys and experiment studies (Elo *et al*., 2008). This study produced quantitative data presented in diagrams and tables. The descriptive analysis technique allowed for interpretation and discussion of the trends and patterns in the data.

3.9 Significance of the study

The research holds significance for African universities by pinpointing areas where usability and visibility can be improved. The outcome of the study can help the development of more user-friendly university websites that are better indexed by search engines, thereby aiding African universities in achieving their online objectives.

3.10 Ethical consideration

In alignment with the Cape Peninsula University (CPUT) code of ethics, this research upheld ethical standards in various aspects:

3.10.1 Risks to participants and/or others

3.10.1.1	The study focused on determining the relationship between the usability and visibility of selected African university websites.
3.10.1.2	No harm was inflicted upon human participants or the environment during the research.

3.10.2 Participant selection

3.10.2.1	Participants were selected based on their availability, internet access, and familiarity with university websites.
3.10.2.2	The researcher maintained professionalism while fostering a trusting environment.
3.10.2.3	Participants were not required to divulge personal information, and no sensitive themes were at risk.
3.10.2.4	Participation was voluntary, with no financial remuneration involved.

3.10.3 Data recording

3.10.3.1	No audio, video, or still picture recordings were made.
3.10.3.2	Participants in the usability study recorded their findings on a pre-designed form, accessible only to the researcher and the supervisor.

3.10.4 Consent process

Consent forms were sent to participants for their agreement with the stipulated terms and conditions.

3.10.5 Data security

Participants' information was kept secure, with published results not revealing personal details.

3.10.6 Integrity

The researcher did not deceive participants in any way.

3.11 Summary

In summary, this chapter served as the blueprint for the investigation, outlining the logical and systematic framework employed to explore the correlation between the usability and visibility of the selected African university websites. The positivist research philosophy grounds the study in objective, factual knowledge, while the deductive research method aligns with the goal of testing established hypotheses derived from previous research. The quantitative approach, integrating usability testing with closed-ended, rating scale questions and quantitative visibility assessments, ensures a comprehensive analysis. The sampling strategies, data collection methods, and analysis techniques are tailored to address the unique characteristics of the study, enhancing the reliability and validity of the findings. As the research methodology unfolds, it paves the way for the evaluation of the usability and visibility of the selected African university websites.

CHAPTER FOUR – DATA ANALYSIS AND FINDINGS

This chapter marks the culmination of the research journey, where the collected data is meticulously analysed to unravel the intricacies of the relationship between usability and visibility in African university websites. The structured methodology detailed in Chapter 3 provides the framework for this analysis. Here, we present the synthesis of quantitative data, shedding light on the correlation between the usability and visibility of the selected African university websites.

4.1 Data collection process and data analysis

This section presents the data collection process and method of analysis used in the study.

4.1.1 University website selection

The researcher identified a couple of institutions that do university rankings. Webometrics appeared in a number of publications, and for that reason was employed in this study. The researcher utilised the webometrics rankings of African universities as of March 2023. Employing a stratified sampling method, the population was then divided into the specified regions—North Africa, Sub-Saharan Africa, and the Rest of Africa. As of March 2023, the University of Cape Town emerged as the highest-ranked university in Sub-Saharan Africa. Additionally, Cairo University and Makerere University secured the top positions in North Africa and the Rest of Africa, respectively. Therefore, they were included in the study. It is worth mentioning that the researcher only included three African university websites due of the time constraint to complete the study.

4.1.2 Participant selection

As stated in the previous chapter, 44 respondents actively took part in the study to test the usability of the sampled African university websites. The selection criteria for participants included considerations for availability, internet access, and familiarity with university websites. To enable convenient remote involvement, the researcher provided links to a Google form questionnaire.

4.1.3 Usability testing

In this study, data regarding the usability of selected African university websites was gathered using an online questionnaire deployed through Google Forms. The questionnaire's introductory section provided participants with a concise overview of the study, outlined specific tasks to be executed on each sampled university website, and furnished clear instructions to ensure survey completion accuracy and avoid any potential confusion. Structured with closed-ended, rating scale questions, the questionnaire focused on user satisfactions. The cumulative scores obtained for each website were then utilised to determine their respective rankings.

Figure 4.1 illustrates a sample rating scale question directed at participants, prompting them to assess the investigated website according to specified usability criteria. In this instance, if a participant selected the label "Good" for load time, it would indicate a value of 4, which is a favourable rating. The scale ranged from the highest rating of 5, denoted as "Very good," to the lowest rating of 0, represented as "Very poor". A score was computed by multiplying the rating's value with the number of times it was selected. Finally, the total score for the usability measurement calculated as shown in Table 4.1.

When all scores are accumulated, the final usability ranking is displayed in a table. The Rank column of the table determines the ranking order.

Figure 4.1: Usability question example #1

Label	Rating	No of Responses	Score
Strongly agree	3	12	36
Somewhat agree	2	24	48
Somewhat disagree	1	4	4
Strongly disagree	0	4	0
		Total score	88

Table 4.1: Calculation of task-level satisfaction

Figure 4.2 shows another sample of rating scale question directed at participants. Here participants rate from 0 to 3 where 0 = "Strongly disagree" and 3 = "Strongly agree".

4. Users have the ability to do online registration for this program.

○ Strongly disagree

○ Somewhat disagree

○ Somewhat agree

○ Strongly agree

Figure 4.2: Usability question example #2

4.1.4 Visibility evaluation

The Weideman model proposes a scoring system that amalgamates credits assigned to the elements of the Binnedell, Chambers, Industry and Visser models. For that reason, it was employed in this study. Only the initial seven elements highlighted in the Weideman model were assessed and examined, due to the extensive evaluative tasks at hand. These seven elements encompass:

     4.1.4.1 Inlinks

     4.1.4.2 Body keywords

     4.1.4.3 Hypertext

     4.1.4.4 Metatags

     4.1.4.5 Title tag

     4.1.4.6 H1 tag

     4.1.4.7 Outlinks
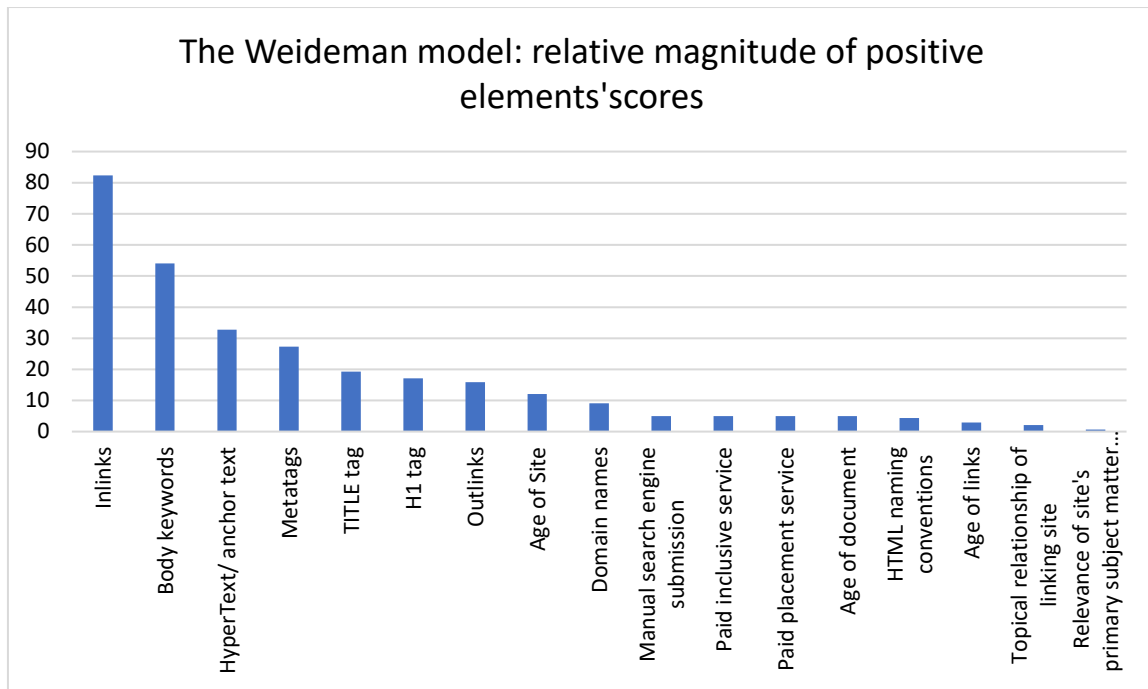
Figure 4.3: Positive elements of Weideman model (Weideman, 2009)

The Inlink and Outlink counts were the only measurements that yielded straightforward values amenable to sorting. The remaining measurements would generate more subjective data, necessitating the identification and application of alternative methods for classification and subsequent ranking. These methods are outlined in Figure 4.4.

In a list, a university's position is merely a numerical identifier. For instance, the list could be sorted alphabetically, with the position providing no indication of performance.

The weight denotes a value assigned to a component of website visibility by the model. A higher weight signifies that a particular element wields a more substantial positive impact on a webpage's visibility.

A university's rank corresponds to its position in a list of universities based on its performance in a specific area. The higher the rank the better the performance based on a particular measurement.

In the evaluation of various description metatags, establishing an objective measurement proved challenging. Consequently, a classification system was introduced within the ranking process. Universities with comparable metrics were clustered and assigned a collective rank. In instances where universities formed a category, the initial rank was replaced by the new

averaged rank. Ultimately, a score was computed by multiplying each weight by the university's overall ranking in the respective measurement.

Pos	Code	Name	Class	Rank	Weight (H Tag)	Score = Rank * Weight		Class	Description
1	CU	Cairo University	5	2	17.1	34.2		1	One H1, very descriptive, some H2 and H3.
2	MU	Makhere University	5	2	17.1	34.2		2	One H1, descriptive, some other Hs.
3	UCT	University of Cape Town	3	3	17.1	51.3		3	One H1, some H2 and/or H3.
								4	One H1.
								5	No H1, some H2 and H3.
								6	Multiple H1 OR no Hs OR Hs present but no-value content.

Figure 4.4: Classification system

The test programs used in the study were SEO Review Tools and Ahrefs. SEO Review Tools provided data about most of the elements while Ahrefs provided information on inlinks.

4.2 Findings

4.2.1 Usability evaluation

The findings from the online questionnaire are as follows:

4.2.1.1 Question 1: Which device did you perform the test on?
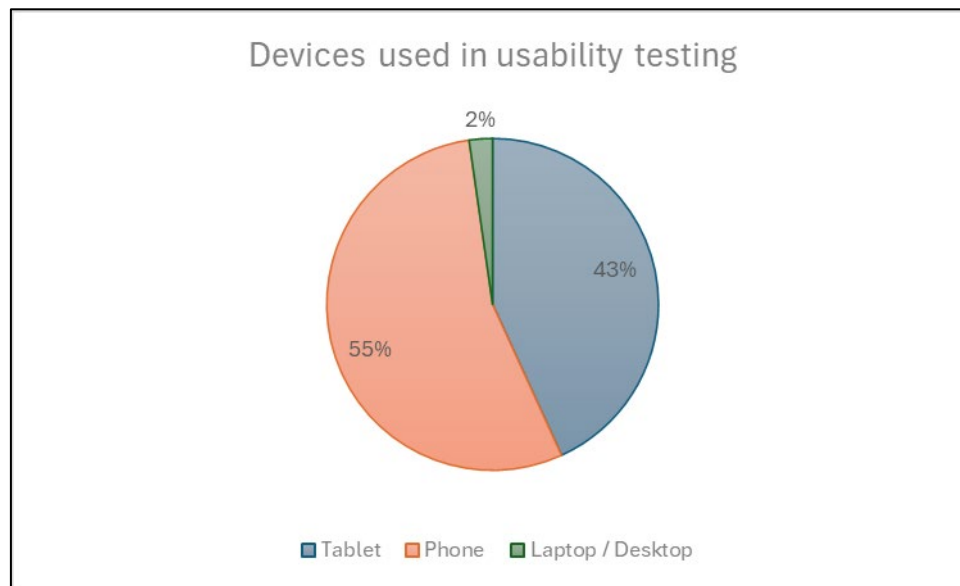
Figure 4.5: Devices used in usability testing

The researcher believes that distribution of participants across different devices in the usability testing is a crucial aspect. The fact that 54% of participants engaged with the African university websites through mobile devices, 43.2% through desktops, and the remainder on tablets sheds light on the diverse ways in which users access these platforms. This information is pertinent as it reflects the increasing prevalence of mobile technology in Africa and highlights the importance of optimising university websites for mobile compatibility.

4.2.1.2 Question 2: Please specify the program you will look for in each university website (e.g.: Mechanical Engineering)

The identification of a specific program by respondents is paramount to the usability study of university websites as it introduces a realistic and task-oriented approach to the evaluation process. By instructing participants to navigate the university websites with the goal of finding admission requirements for a chosen program and determining the feasibility of online registration, the study ensures that the tasks align with functionalities that are crucial for prospective students. This approach mirrors the real-world scenario where individuals visiting

university websites typically seek program-specific information and look for practical details related to enrolment processes. Analysing user interactions within the context of a chosen program allows for a more focused assessment of the website's effectiveness in delivering pertinent information, evaluating the accessibility of admission requirements, and assessing the ease of online registration processes. Therefore, the identification of a program enhances the study's relevance by aligning it closely with the actual user needs and behaviours associated with prospective students exploring academic offerings on university websites.

Figure 4.6 illustrate Accounting, Engineering and Information Technologies were the most chosen programs amongst the respondents. This information ensured that the usability study is not only comprehensive but also practical and applicable to the most sought-after academic areas. Secondly, this insight provides valuable data on the specific academic areas that attract the highest interest among potential students, shedding light on the priorities and preferences within the participant pool. This knowledge is instrumental for universities in tailoring their website content and navigation to better cater to the needs of individuals seeking information about these popular programs.
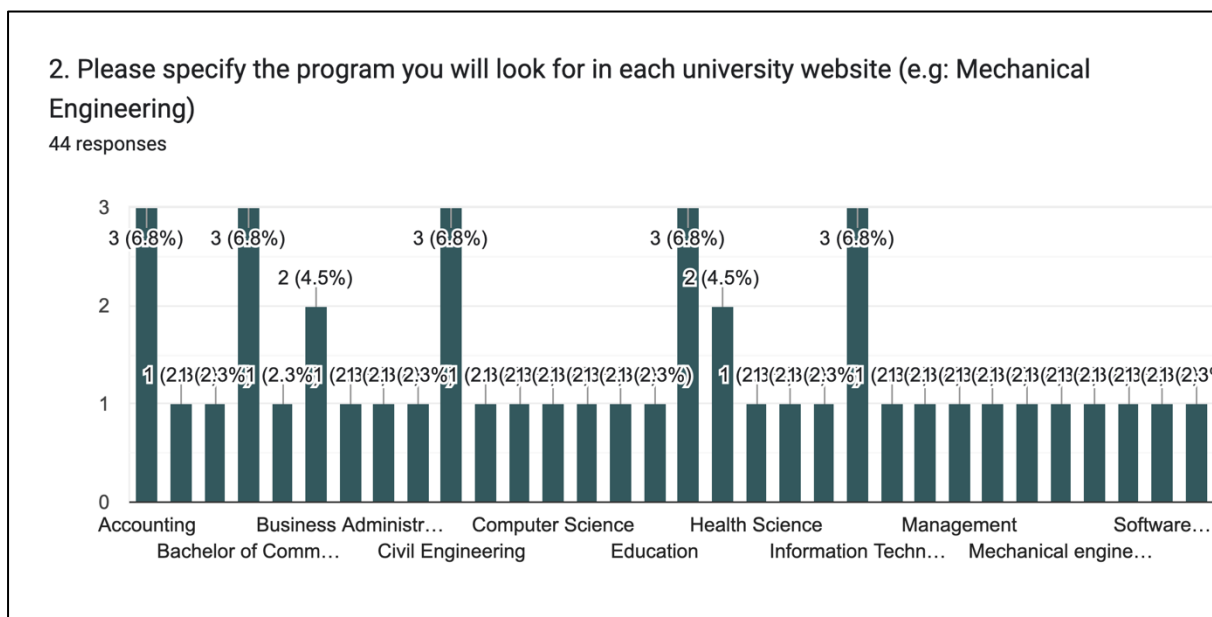
Figure 4.6: Selected programs amongst respondents

Question 3 and 4 helped the research assess the participants satisfaction after performing the following tasks:

4.2.1.2.1   Go to the university website and see if you can find admission requirements for a program of your choice.

4.2.1.2.2   Find out whether it is possible to do an online registration.

4.2.1.3 Question 3: Were you able to find the admission requirements related to the selected program?

The respondents' ability to locate admission requirements related to their selected programs on the university websites is a critical aspect of the usability study. This information is highly relevant as it directly assesses the respondent's satisfaction and user-friendliness of the websites.
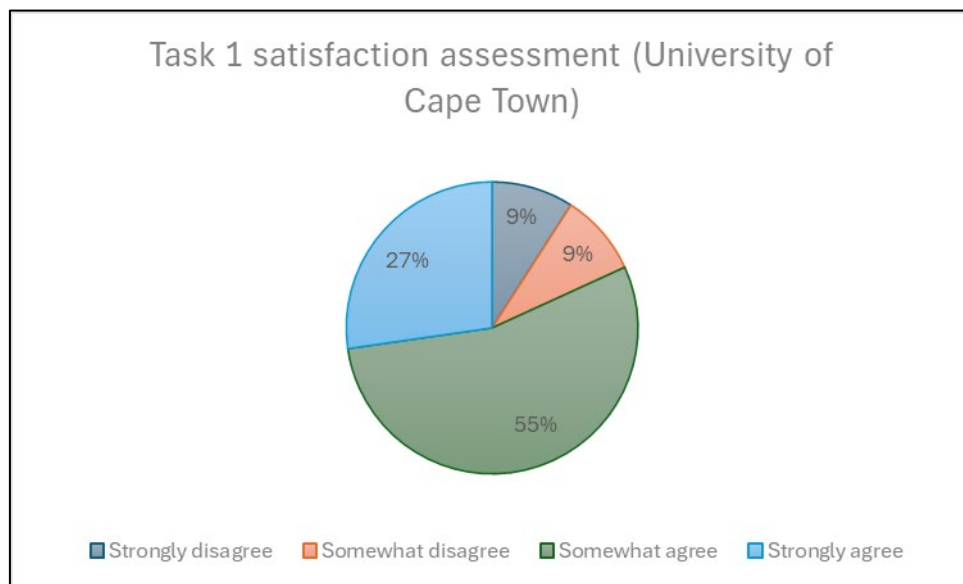
Figure 4.7: Task 1 satisfaction assessment (University of Cape Town)

The results indicated that, in general, 18.2% of participants encountered challenges in locating admission requirements, whereas a substantial 81.8% had no difficulty finding information related to their chosen programs. The data collected was used to compute the scores, as illustrated in Table 4.2.

Label	Rating	No of Responses	Score
Strongly agree	3	12	36
Somewhat agree	2	24	48
Somewhat disagree	1	4	4
Strongly disagree	0	4	0
		Total score	88

Table 4.2: Task 1 satisfaction assessment results (University of Cape Town)
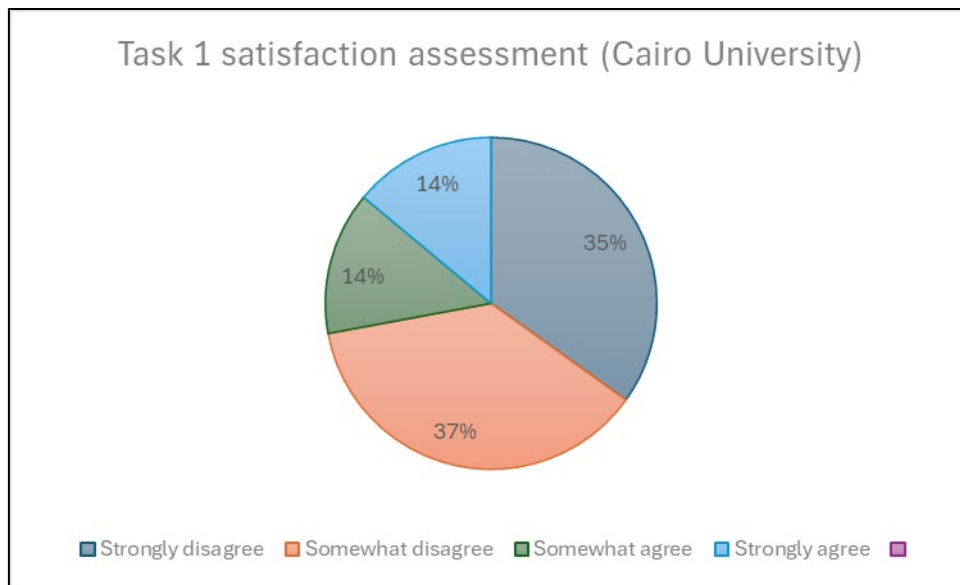
Figure 4.8: Task 1 satisfaction assessment (Cairo University)

The results revealed that, on the whole, just 28% of the respondents managed to find admission requirements, while a notable 72.1% encountered difficulties in locating requirements related to their selected programs. The collected data was then utilised to compute the scores, as illustrated in Table 4.3.

Label	Rating	No of Responses	Score
Strongly agree	3	6	18
Somewhat agree	2	6	12
Somewhat disagree	1	16	16
Strongly disagree	0	15	0
		Total score	46

Table 4.3: Task 1 satisfaction assessment results (Cairo University)
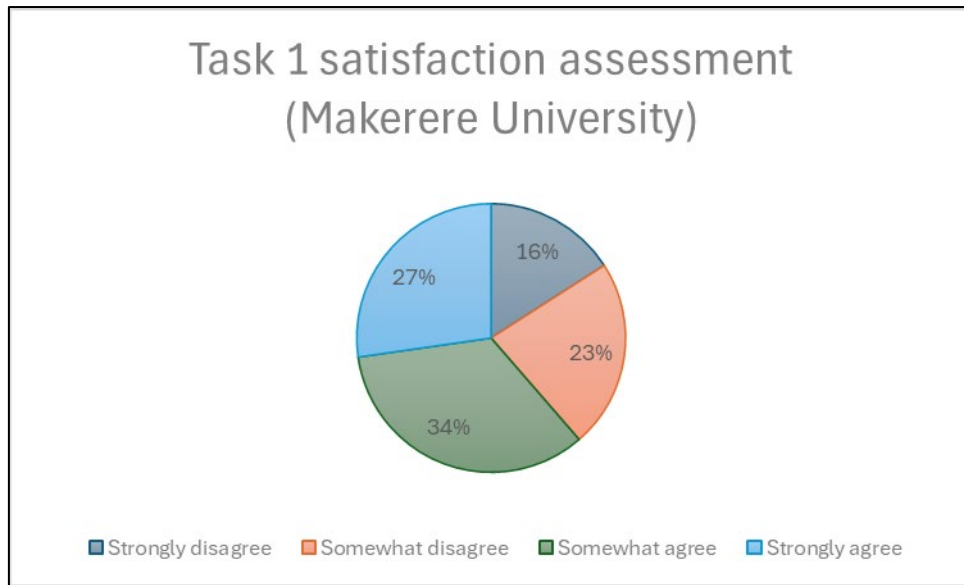
Figure 4.9: Task 1 satisfaction assessment (Makerere University)

The findings indicate that the overwhelming majority successfully found academic requirements related to their chosen programs. Only 38.1% encountered difficulties in accessing academic information for their selected programs. Subsequently, the collected data was employed to calculate the scores, as depicted in Table 4.4.

Label	Rating	No of Responses	Score
Strongly agree	3	12	36
Somewhat agree	2	15	30
Somewhat disagree	1	10	10
Strongly disagree	0	7	0
		Total score	76

Table 4.4: Task 1 satisfaction assessment results (Makerere University)

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	46
2	MU	Makerere University	2	76
3	UCT	University of Cape Town	1	88

Table 4.5: Task 1 ranking

A higher level of satisfaction is indicated by a higher score. The figures indicate that the respondents found it a lot easier to find academic requirements related to their chosen programs on the websites of Makerere University and the University of Cape Town. Cairo University score was below average.

4.2.1.4 Question 4: Do you have the ability to do online registration for this program?

The question directly addresses a key functionality of university websites – the online registration process. Understanding whether respondents perceive and can execute online registration provides crucial insights into the user experience and usability of the websites in facilitating an essential task for prospective students.
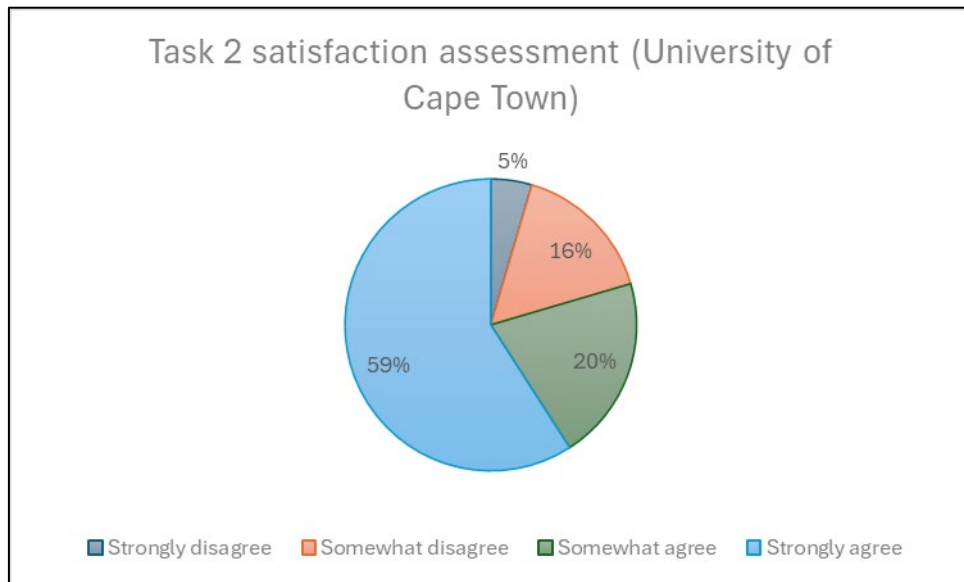
Figure 4.10: Task 2 satisfaction assessment (University of Cape Town)

Concerning the University of Cape Town, the overwhelming majority of respondents indicated that performing online registration on the university website was feasible.
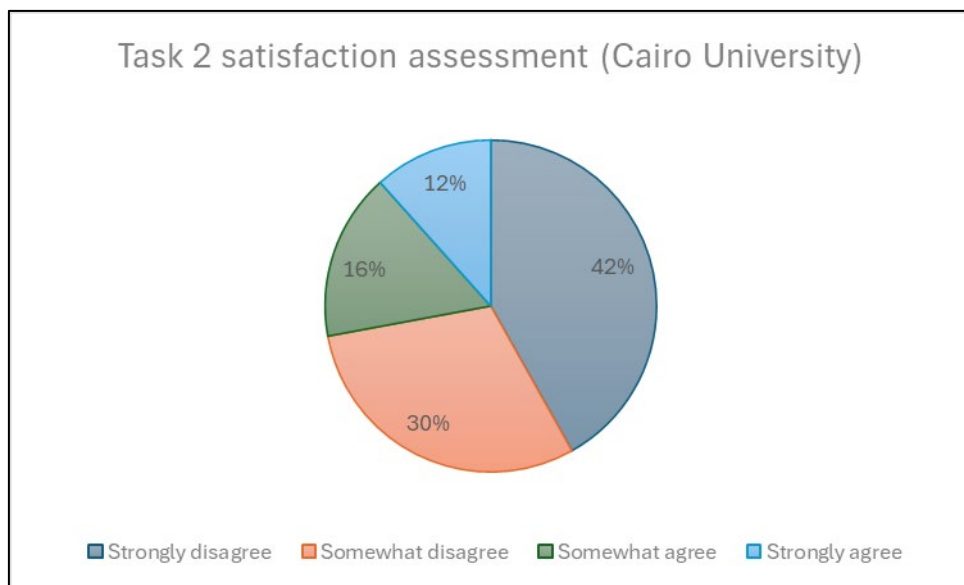
Figure 4.11: Task 2 satisfaction assessment (Cairo University)

Regarding Cairo University, it is notable that a majority of respondents expressed a lack of capability to conduct online registration on the university's website.
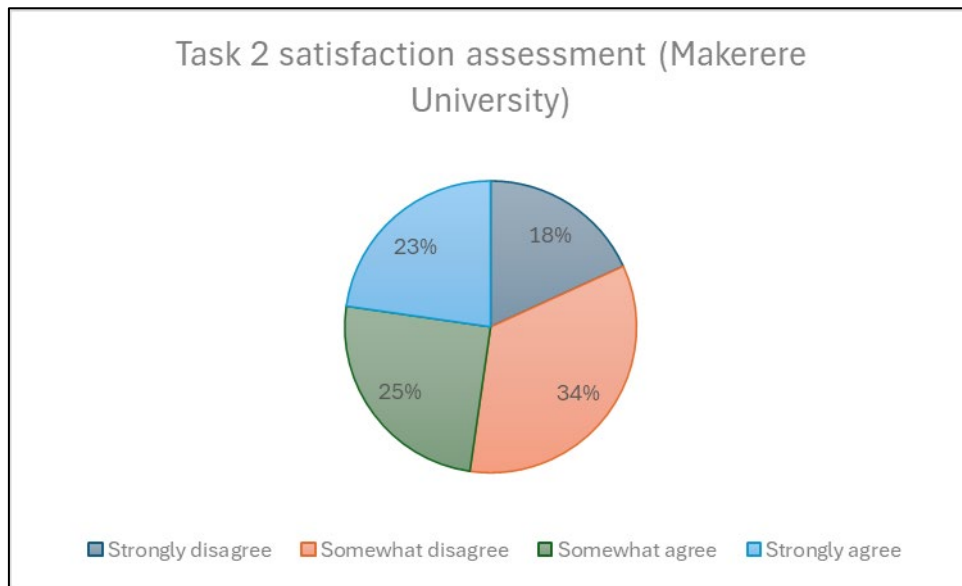
Figure 4.12: Task 2 satisfaction assessment (Makerere University)

Concerning Makerere University, it is noteworthy that only 47.1% of participants reported having the ability to carry out online registration.

Table 4.6 depicts the overall satisfaction scores for task 2. Notably, the University of Cape Town achieved the highest score at 85, whereas Cairo University received the lowest score, standing at 42.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	42
2	MU	Makerere University	2	67
3	UCT	University of Cape Town	1	85

Table 4.6: Task 2 ranking

4.2.1.5 Question 5: Are you confident that you can re-perform the same actions without any assistance?

This question is highly relevant to the research study as it directly addresses the memorability attribute of the university websites. This question is designed to assess participants' confidence in their ability to recall and replicate the steps or actions they took during the usability testing without requiring external assistance.

Figures 4.13, 4.14, and 4.15 visually present the performance of the University of Cape Town, Cairo University, and Makerere University, respectively, concerning the memorability attribute.
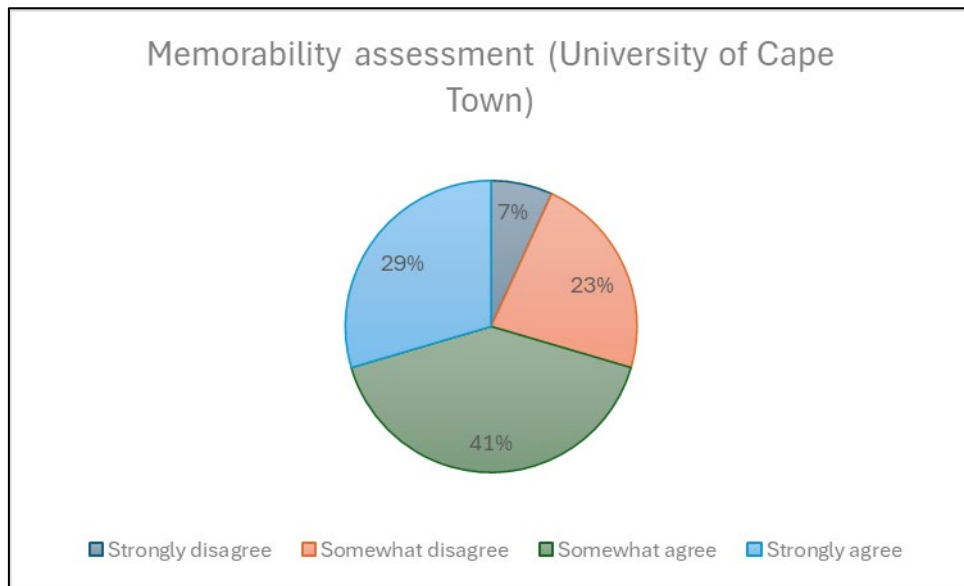
Figure 4.13: Memorability assessment (University of Cape Town)

A confidence level of 70.4% was observed among respondents when it came to replicating tasks performed on the University of Cape Town's website.
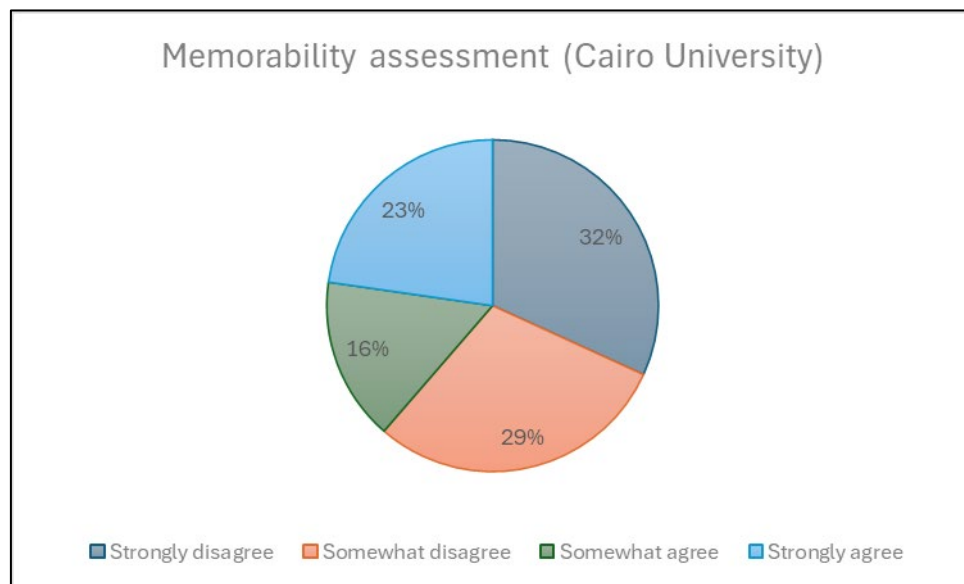
Figure 4.14: Memorability assessment (Cairo University)

A majority of respondents, specifically 61.3%, expressed doubt in their ability to replicate their actions without assistance.
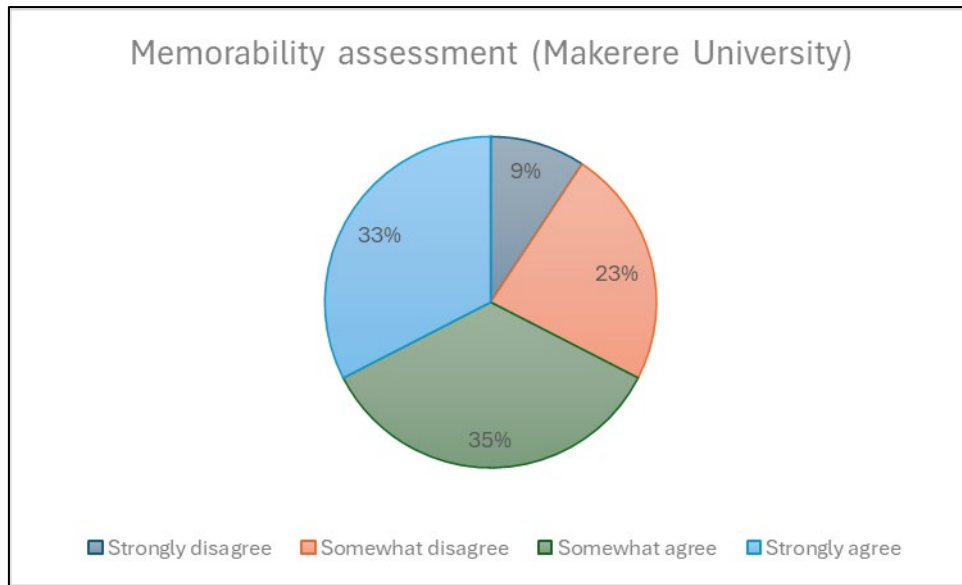
Figure 4.15: Memorability assessment (Makerere University)

Over 60% of the respondents demonstrated confidence in their capability to reproduce the actions performed on Makerere University's website.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	57
2	MU	Makerere University	2	82
3	UCT	University of Cape Town	1	85

Table 4.7: Memorability assessment ranking

4.2.1.6 Question 6: Ranking the university websites based on usefulness of information, overall appearance, page layout, page load time, overall ease of use, ease of navigation, and ease of finding information.

This question provides a holistic and user-centric evaluation of the websites by considering multiple dimensions. By asking respondents to rank these specific aspects, the study gains insights into the overall user perception of the websites, encompassing not only the content relevance but also the visual appeal, functionality, and user experience.

Secondly, the inclusion of diverse criteria, such as page load time and ease of finding information, allows for a nuanced analysis of the different facets contributing to usability. Slow page load times, for instance, can significantly impact the user experience, and this question helps to identify if such technical factors influence the perceived usefulness and ease of use of the websites.

Table 4.8 displays the rankings based on the usefulness of information. Cairo University accumulated a score of 72, falling below the average score of 88. The maximum score possible, calculated as the number of participants multiplied by the highest rating value (4 for "Very good"), is 176.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	72
2	MU	Makerere University	2	100
3	UCT	University of Cape Town	1	128

Table 4.8: Usefulness of Information

Similarly, the remaining usability parameters were assessed using the same methodology.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	86
2	MU	Makerere University	2	102
3	UCT	University of Cape Town	1	130

Table 4.9: Overall appearance

The scores indicate that the University of Cape Town achieved the highest overall appearance rating among the sampled African universities with a score of 130. Makerere University follows with a score of 102. Cairo University is ranked third with a score of 86.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	87
2	MU	Makerere University	2	99
3	UCT	University of Cape Town	1	118

Table 4.10: Page layout

The results suggest that the University of Cape Town attained the top position for page layout among the sampled universities, achieving a score of 118. Following closely is Makerere University, securing the second spot with a score of 99. Cairo University takes the third position with a score of 87.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	103
2	MU	Makerere University	2	111
3	UCT	University of Cape Town	1	122

Table 4.11: Page load time

The results show that the University of Cape Town had the highest page load time among the sampled university websites, with a score of 122. Makerere University takes second place with a score of 111. Cairo University ranks third, with a score of 103.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	81
2	MU	Makerere University	2	102
3	UCT	University of Cape Town	1	111

Table 4.12: Ease of use

The findings indicate that the University of Cape Town received the highest ranking for ease of use among the sampled universities, with a score of 111. Makerere University follows closely behind with a score of 102. Cairo University is placed third, with a score of 81.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	83
2	MU	Makerere University	2	102
3	UCT	University of Cape Town	1	108

Table 4.13: Ease of navigation

The scores show that the University of Cape Town had the highest score for ease of navigation among the sampled universities (108). Makerere University is close behind, scoring 102. Cairo University ranks third with a score of 83.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	70
2	MU	Makerere University	2	88
3	UCT	University of Cape Town	1	115

Table 4.14: Ease of finding information

The statistics indicate that the University of Cape Town had the greatest ranking for ease of finding information among the sampled universities, with a score of 115. Makerere University is next with a score of 88. Cairo University ranks third with a score of 70.

Ultimately, the total score was computed by summing the individual scores of each website for every usability parameter. Table 4.15 demonstrates that the University of Cape Town's website emerged as the most user-friendly, whereas Cairo University's website received the lowest user-friendly rating.

Position	Code	Name	Rank	Score
1	CU	Cairo University	3	726
2	MU	Makerere University	2	929
3	UCT	University of Cape Town	1	1090

Table 4.15: Cumulative scores

The ranking aligns with the responses provided by the participants for the final question in the online questionnaire.

4.2.1.7 Question 7: Which university website was the most usable?

The provides a direct insight into the subjective user perception of the usability of the assessed websites. Users' opinions on which website they consider the most usable reflect their overall satisfaction and comfort with the interface, navigation, and design of the websites.

The question was posed to ensure that the provided answers are consistent and aligned with one another.
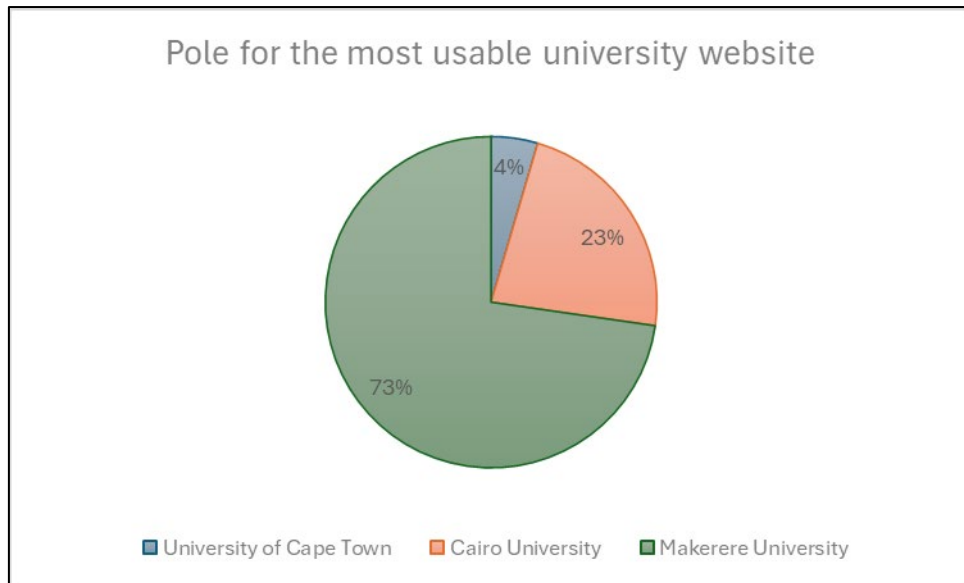
Figure 4.16: Pole for the most usable university website

The answers provided confirmed that the website of the University of Cape Town was identified as the most usable, while Cairo University's website obtained the lowest user-friendly rating.

4.2.2 Visibility evaluation

This section delves into the examination of visibility elements found on the websites. Given the time constraint to complete the study the visibility elements were only analysed on the homepage of the universities.

4.2.2.1 Inlinks

According to Weideman (2009), the number of inlinks to a particular website is widely acknowledged as a substantial factor influencing website visibility. In the Weideman model, this element received paramount importance and is assigned the highest weight of 82.3 (see Table 2.7). The unique nature of the three universities led to distinct inlink counts without the necessity for assigning classes. Consequently, the class and rank values were identical, ranging from three to one. Ahrefs was employed to get the inlink counts. Figure 4.17 shows how Ahrefs displays the inlink count.

The list of university is sorted in alphabetical order. The university with the highest inlink count was assigned the highest rank. Finally, the score was calculated by multiplying the rank by the weight (82.3) for each university. The ranks are listed in Table 4.16
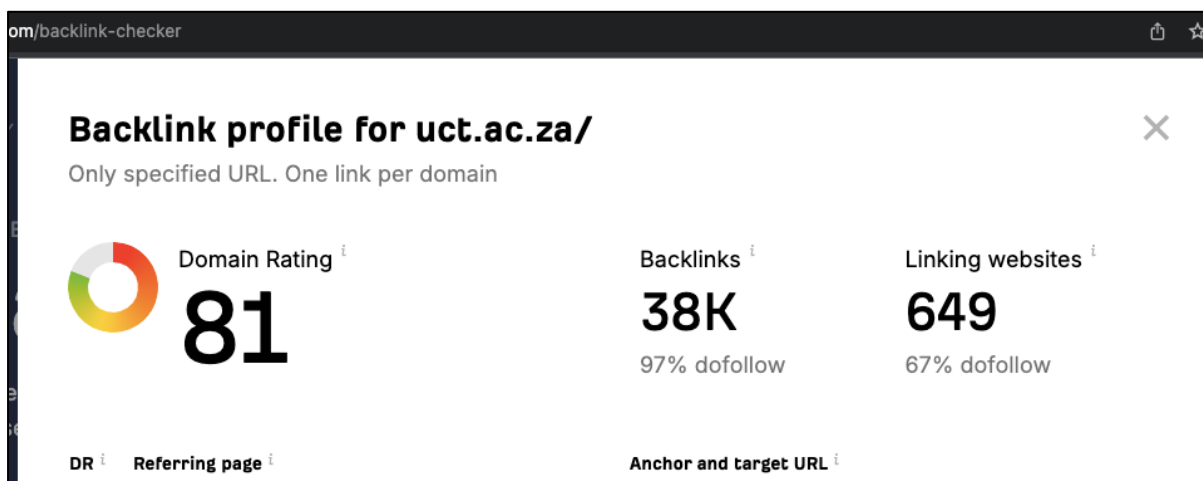
Figure 4.17: Inlink count as displayed by Ahrefs

Position	Code	Name	Inlinks Count	Rank	Score
1	CU	Cairo University	739	2	164.6
2	MU	Makerere University	2400	3	246.9
3	UCT	University of Cape Town	649	1	82.3

Table 4.16: Counting the number of inbound links

4.2.2.2 Body Keywords

Body keywords of a webpage have been found as the second most important component in website visibility (Weideman 2009). Given the subjective nature of this assessment compared to mere inlink counting, a class system was employed to categorise websites of similar quality based on their usage of body keywords. The browser's inspect feature was employed to analyse the keywords on the universities' homepage.

The universities were assessed and assigned grades based on the effectiveness of keyword optimisation on the homepage using the designated classes in Table 4.17.

Class	Description
1	The first keyword/phrase includes the complete university name.
2	The initial keyword or phrase omits the complete university name, whereas the second keyword or phrase explicitly incorporates it.
3	The combination of the first and second keywords or phrases results in the complete university name expressed as distinct terms.

4	None of Class 1, 2, or 3 incorporates parts of the name, but the university name is present in the first five keywords or key phrases, while other terms describe a university.
5	The university name is not among the first five keywords or key phrases, but other related terms are present.

Table 4.17: Classes for keyword analysis

As per Table 2.7, the weight assigned to the second visibility element is 54.0. This weight played a crucial role in computing the final scores for each university, determined by multiplying the rank with the weight to derive the score. Table 4.18 Assesses keyword optimisation within the university homepages.

Position	Code	Name	Class	Rank	Score
1	CU	Cairo University	1	3	162
2	MU	Makerere University	5	1	108
3	UCT	University of Cape Town	5	1	108

Table 4.18: Assessing keyword optimisation within the university homepages

4.2.2.3 Hypertext/Anchor text

This feature was measured using SEO Review Tools. As per Table 2.7, the weight assigned to the third visibility element is 32.8. Table 4.19 compares the number of anchor text within the university webpages.
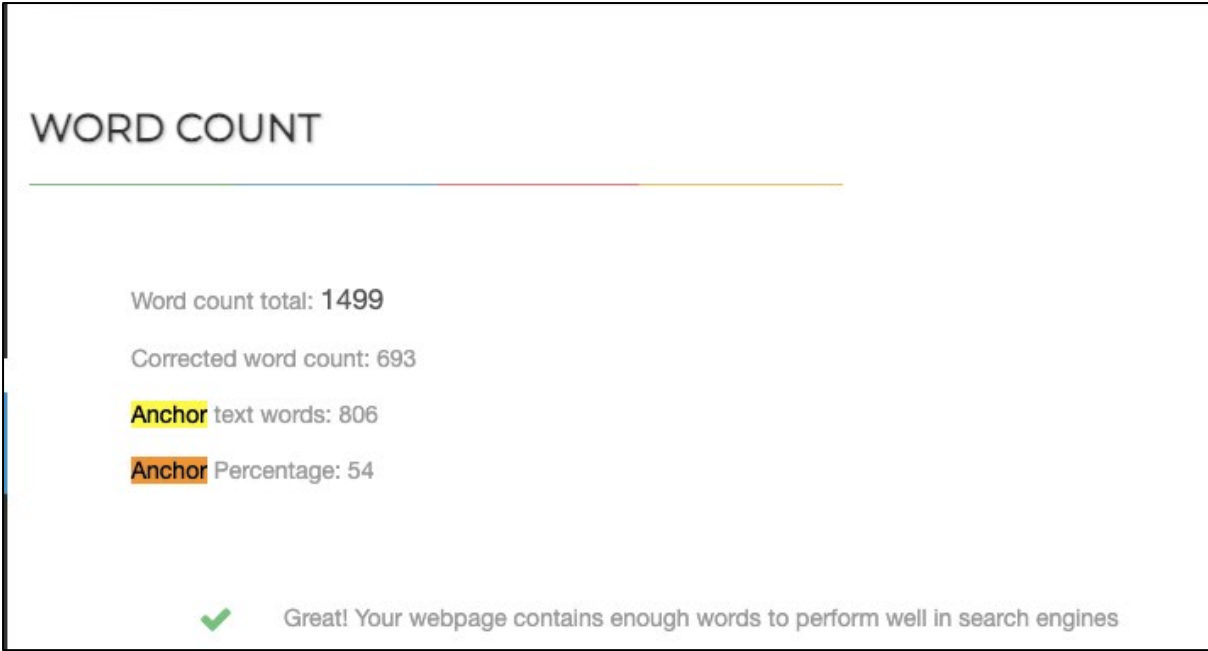
Figure 4.18: How SEO Review Tools displays Anchor text measurements

Position	Code	Name	Anchor text count	Rank	Score
1	CU	Cairo University	569	1	32.8
2	MU	Makerere University	580	2	65.6
3	UCT	University of Cape Town	809	3	98.4

Table 4.19: Comparing anchor text within the university webpages

4.2.2.4 Description metatag

The description metatag is the fourth visibility element with a weight of 27.3 (see Table 2.7). It was analysed using SEO Review Tools. The universities were ranked based on the significance of their site description metatags. A class definition was deemed necessary, particularly for university homepages with unique yet comparable value tags.
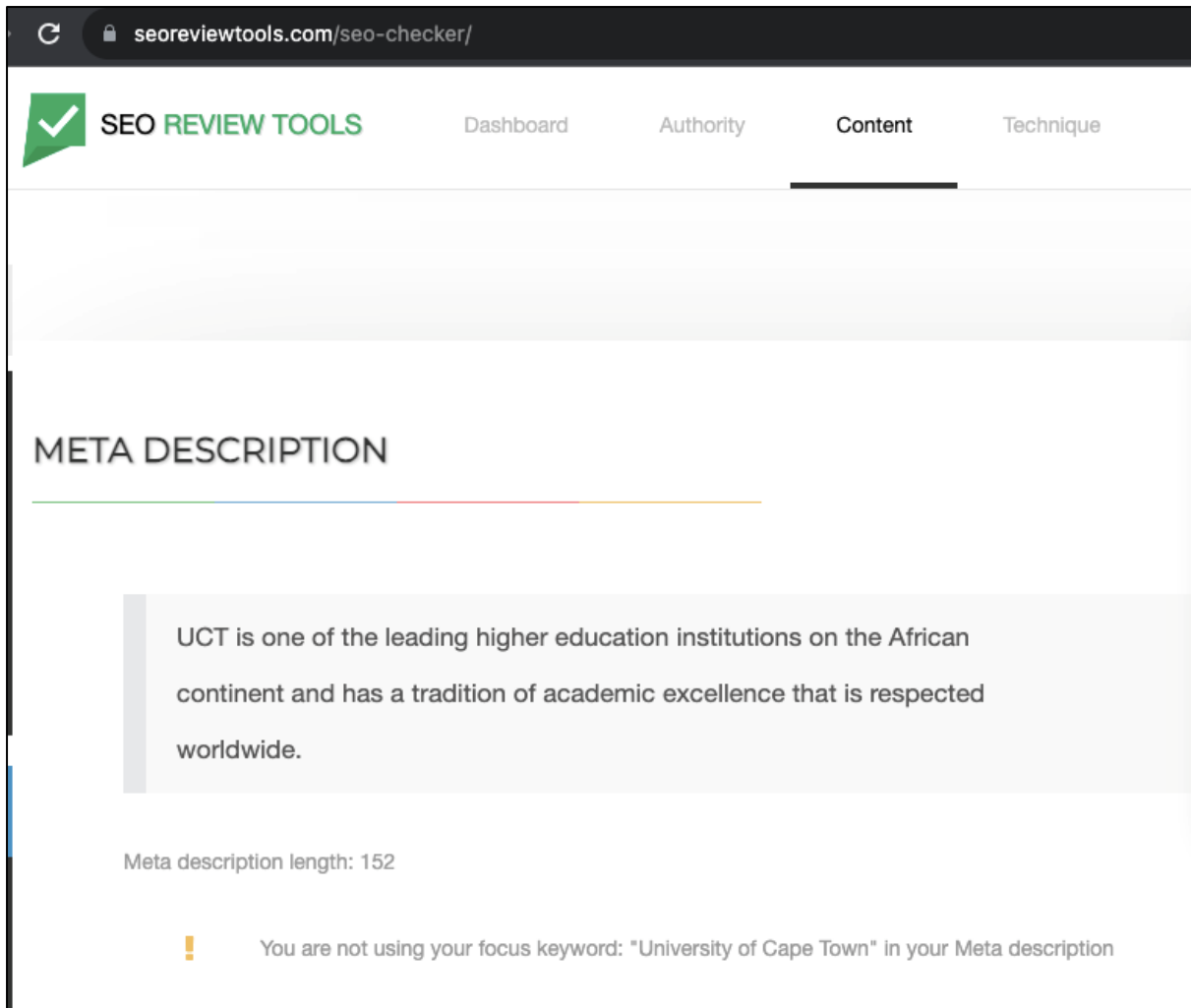
Figure 4.19: How SEO Review Tools displays meta description

Class	Description
1	Meta descriptions comprising multiple sentences, rich in keywords, well-crafted, and strongly related to the university.
2	Meta descriptions with multiple sentences that are university-related and contain some relevant keywords.
3	University-related meta descriptions in a single sentence, featuring some relevant keywords.
4	Concise meta descriptions in short phrases with a few relevant keywords.
5	Meta descriptions lacking relevant keywords.
6	No meta description found.

Table 4.20: Classes for description analysis

Position	Code	Name	Class	Rank	Score
1	CU	Cairo University	3	3	81.9
2	MU	Makerere University	6	1	27.3
3	UCT	University of Cape Town	3	3	81.9

Table 4.21: Analysing the usage of description metatags within university homepages

4.2.2.5 Title tag

The title tag is the fifth element under consideration, carrying a weight of 19.3. Classes needed to be generated to group similar entries.
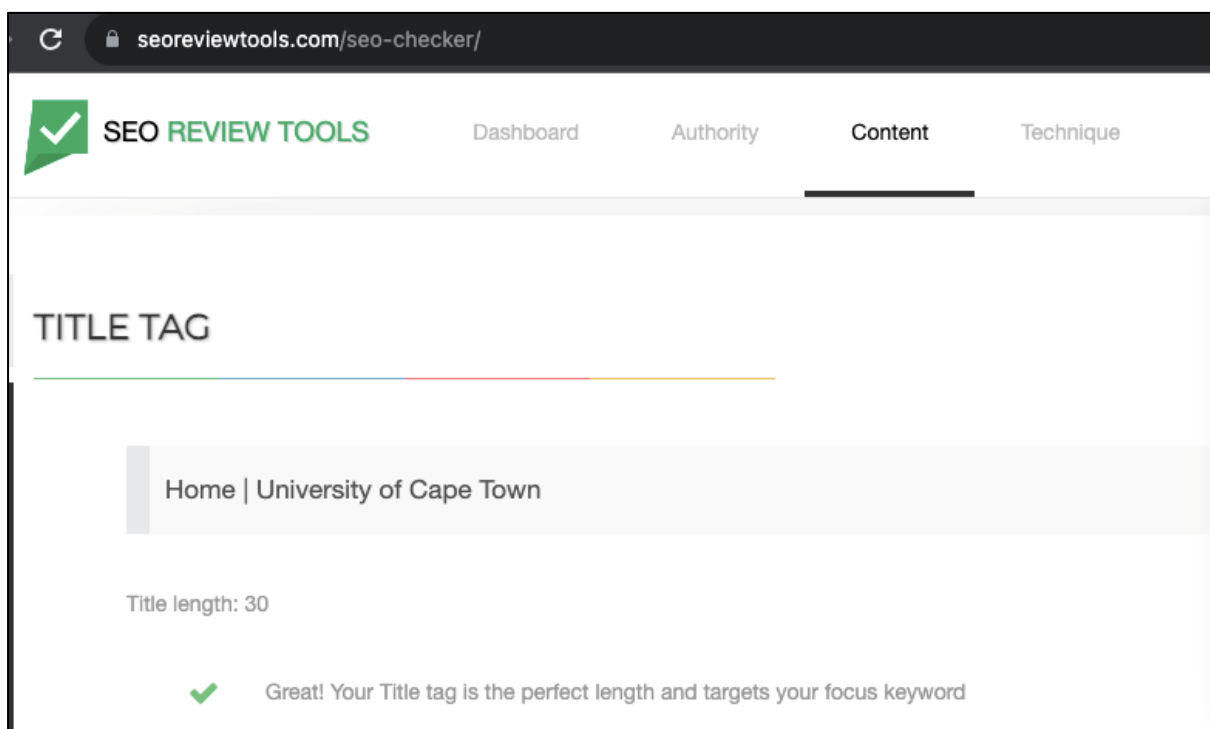
Figure 4.20: How SEO Review Tools displays the title

| Class	Description
1	Initiates with the full university name, supplemented by other highly relevant keywords.
2	Incorporates the full university name in conjunction with other pertinent terms.
3	Solely features the complete university name.
4	Commences with the full university name, followed by no-value terms (e.g., Welcome, Homepage).
5	Initiates with words of no substantive value.
6	Lacks a title tag.

Table 4.22: Classes for title analysis

Table 4.23 provides a summary of the scores obtained by the homepages for the title tag.

Position	Code	Name	Class	Rank	Score
1	CU	Cairo University	3	3	57.9
2	MU	Makerere University	4	2	38.6
3	UCT	University of Cape Town	5	1	19.3

Table 4.23: Analysing the usage of title tags within university homepages

4.2.2.6 Heading tag

Next up are the H1 tags, carrying a weight of 17.1. The crawler attaches more value to H1 than the other heading tags and the best practices suggest using only one H1 tag per page, incorporating relevant keywords, and including some lower-level H tags. Hence the following Classes were generated.
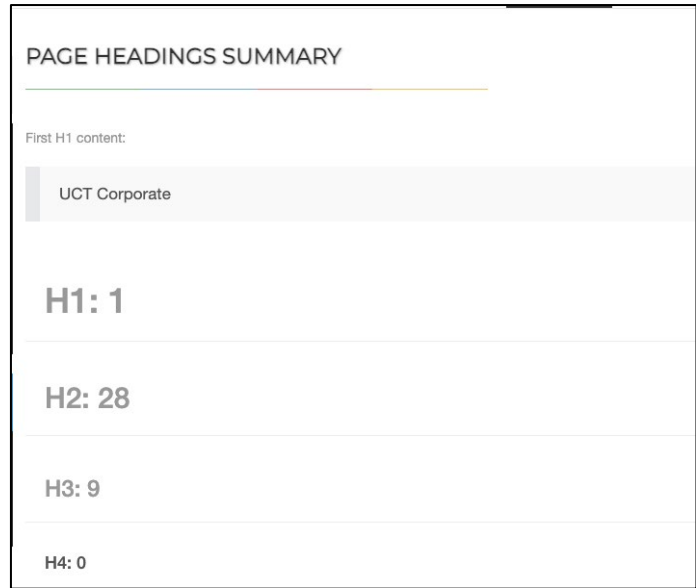
Figure 4.21: How SEO Review Tools displays headings information

Class	Description
1	One H1, highly descriptive, accompanied by some H2 and H3 tags.
2	One H1, descriptive, with some other H tags.
3	One H1, featuring some H2 and/or H3 tags.
4	Only one H1 present.
5	No H1, but some H2 and H3 tags are present.
6	Either multiple instances of H1 tags, the absence of any H tags, or the presence of H tags without meaningful content.

Table 4.24: Classes for heading tags analysis

Position	Code	Name	Class	Rank	Score
1	CU	Cairo University	5	2	34.2
2	MU	Makerere University	5	2	34.2
3	UCT	University of Cape Town	3	3	51.3

Table 4.25: Overview of the scores attained by the homepages in relation to the H tags

4.2.2.7 Outlinks

Outlinks carry a weight of 15.9. Ahrefs was employed to get the count for each website. Classes were not needed as distinct values were produced. The score then calculated by multiplying the weight by the rank.

51
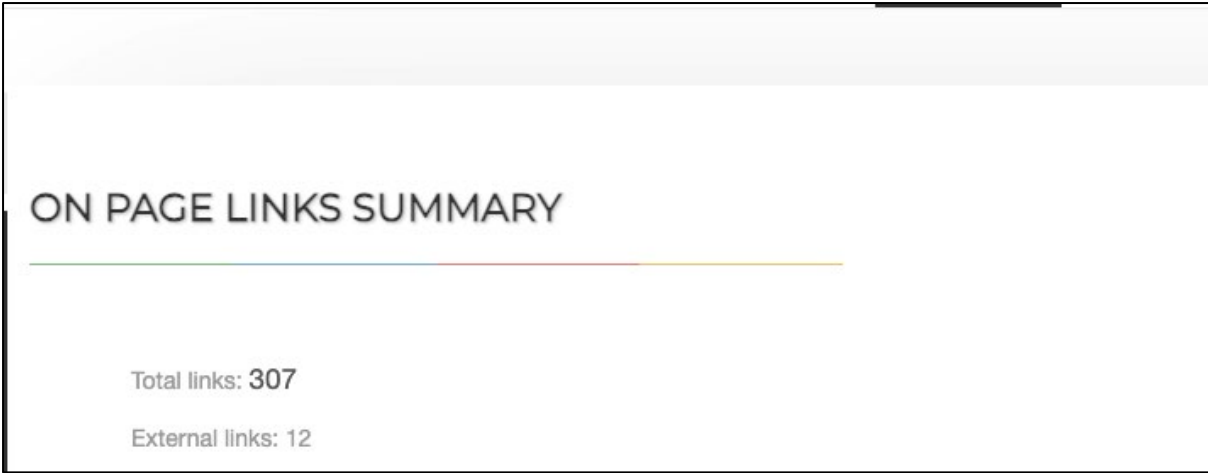
Figure 4.22: How SEO Review Tools displays outlinks information

Position	Code	Name	Outlinks Count	Rank	Score
1	CU	Cairo University	10	1	15.9
2	MU	Makerere University	15	3	47.7
3	UCT	University of Cape Town	14	2	31.8

Table 4.26: Comparison of the score achieved by the websites for outlinks

4.2.2.8 Cumulative score

The cumulative score for all university websites evaluations was calculated, as presented in Table 4.27, reflecting the total across all seven score columns determined in the preceding sections. A higher score signifies a greater level of website visibility for a website.

Position	Code	Name	Rank	Score
1	CU	Cairo University	2	549.3
2	MU	Makerere University	1	568.3
3	UCT	University of Cape Town	3	473

Table 4.27: Comparing visibility score

4.2.3 Spearman's rank correlation

An effort was undertaken to assess the existence of a statistical correlation between the website visibility rankings and the website usability rankings of the sampled African universities.

Considering that the formula for Spearman's rank correlation coefficient is provided by:

$$rs = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)}$$

Where "r" denotes the coefficient, "n" is the count of data pairs, and "d" signifies the squared difference in ranks for each data pair.

Name	Rank in terms of visibility	Rank in terms of usability	Difference	Difference (squared)
Cairo University	2	3	1	1
Makerere University	1	2	1	1
University of Cape Town	3	1	-2	4

Table 4.28: Calculating squared difference

In this context, it is evident that "n" is 3, accounting for the 3 data pairs, and the sum of the squared difference in ranks is $\sum d_i^2$ is 4 + 1 + 1 = 6

Therefore, the Spearman's rank correlation coefficient is:

$$rs = 1 - \frac{6(6)}{3(3^2 - 1)}$$

$$rs = 1 - \frac{6(6)}{3(9 - 1)}$$

$$rs = 1 - \frac{36}{3(8)}$$

$$rs = 1 - \frac{36}{24}$$

$$rs = 1 - 1.5$$

$$rs = -0.5$$

$$-1 < -0.5 < 1$$

The spearman's rank correlation produce -0.5, which confirms that there is no correlation between the two rankings of the sampled African university websites.

4.3 Summary

In summary, Chapter 4 served as the analytical core of the thesis, presenting the outcomes derived from the robust research methodology outlined in Chapter 3. The quantitative data, garnered through usability testing, was carefully examined to discern the usability score of each website. Simultaneously, the quantitative data, derived from visibility assessments based on the Weideman model, was subjected to statistical analysis. Using the Spearman's rank correlation technique, the chapter explored whether there is a relationship between usability and visibility of the sampled of African university websites.

CHAPTER FIVE – CONCLUSION AND RECOMMENDATIONS

This section synthesises insights derived from the research findings and their analysis, providing key conclusions and corresponding recommendations.

5.1 Conclusion

The aim of the research was to determine whether there is a correlation between the usability and visibility of the selected African university websites by answering the research question and sub-questions.

5.1.1 Research question

5.1.1.1 What is the relationship between the usability and visibility of the selected African university websites?

The primary focus of the research was to explore the connection between the usability and visibility of chosen African university websites. Employing the Spearman's rank correlation technique and analysing the results of both visibility and usability assessments, the study found no apparent correlation between the rankings of usability and website visibility among the selected African universities.

5.1.2 Research sub-questions

5.1.2.1 Which African universities currently hold top positions based on academic rankings from recognised academic ranking institutions?

The researcher identified several institutions engaged in university rankings, and Webometrics, featured in numerous publications, was selected for inclusion in this study. The webometrics rankings of African universities as of March 2023 were utilised. Employing a stratified sampling method, the population was categorised into specific regions—North Africa, Sub-Saharan Africa, and the Rest of Africa. The University of Cape Town held the highest rank in Sub-Saharan Africa as of March 2023. Cairo University and Makerere University secured the top positions in North Africa and the Rest of Africa, respectively, and were consequently included in the study. It is noteworthy that, due to time constraints, the researcher limited the inclusion to three African university websites for the study.

5.1.2.2 How does the usability of the websites of the selected African universities fare, as assessed through usability testing?

The study on usability uncovered that the University of Cape Town's website was recognised as the most usable, with Cairo University's website receiving the lowest user-friendly rating. Furthermore, the research confirmed the ongoing presence of challenges related to usability and visibility in university websites. Notable usability issues included users facing difficulties in performing crucial actions independently, encountering challenges in finding academic requirements for their chosen programs, and experiencing navigation issues, among others.

5.1.2.3 What are the visibility ranking scores of the selected African university websites?

The sampled African university websites underwent an assessment based on the visibility elements outlined in the Weideman model. The examination revealed various issues, including the absence of headings, the university name not being among the first five keywords, the lack of a description metatag, the presence of irrelevant keywords in the description, and title tags starting with non-substantive words, among other concerns.

Interestingly, the cumulative scores indicated that Makerere University had the highest visibility level (568.3), followed by Cairo University in second place with 549.3, and the University of Cape Town in third place with 473.

5.1.2.4 Which tool can be used to determine the correlation between the usability and visibility of the selected African university websites?

To determine the correlation between the usability and visibility of the selected African university websites, the Spearman rank correlation method was employed. This method was chosen due to its suitability for analysing correlations between two ordinal variables.

5.1.3 Research hypothesis

The research proposed a null hypothesis (H0) indicating no correlation between the usability and visibility of African university websites, while the alternative hypothesis (H1) asserted a significant correlation.

Given the absence of an apparent correlation between the usability and visibility of the sampled African university websites, the null hypothesis posited in this research is not rejected.

5.1.4 Summary

This study delved into the connection between the usability and visibility rankings of a selected sample of African university websites. Three universities from distinct regions of Africa were chosen based on webometrics rankings to fulfil this objective. The usability and visibility of each university's websites underwent assessment, and the rankings resulting from each evaluation were compared using Spearman's rank correlation.

It can be asserted that there is no discernible correlation between the usability rankings and website visibility rankings for the sampled African universities. The author anticipated this outcome, considering the absence of an apparent link between the factors used to determine them. Therefore, the null hypothesis that this research posited is not rejected. It can be claimed that the best practices for improved usability and visibility do not clash.

It is worth mentioning that these findings sharply differ from the study conducted on Turkish university websites (Peker *et al*. 2011). A reason for this could be the difference in sampling sizes. This research focused on a sampling population of three African universities, while the study by Peker *et al.* (2011) included a sampling population comprising five Turkish universities. Subsequent research endeavours may involve a broader selection of African universities. Additionally, it is advisable to explore the utilisation of professional and paid testing programs instead of relying solely on free SEO tools.

Moreover, the research affirmed the persistence of usability and visibility challenges within university websites. Usability concerns were underscored, including users encountering difficulties in executing essential actions independently, struggles in locating academic requirements for their chosen programs, and issues with navigation, among others. Similarly, visibility issues were identified, such as the absence of headings, the university name not appearing among the first five keywords, the absence of a description metatag, the presence of irrelevant keywords in the description, and title tags commencing with non-substantive words, among other issues.

5.2 Contributions

This study stands out as one of the initial attempts to thoroughly evaluate and gauge the visibility and usability of a sample of African university websites.

Its importance lies in providing valuable insights to African universities, highlighting areas where improvements in usability and visibility scores can be made.

Consequently, the research aimed to assist African universities in recognising deficiencies in usability, fostering enhancements, and enhancing their web visibility scores. This initiative aimed to simplify the process for universities to create more user-friendly web pages that are also better indexed by search engines.

5.3 Recommendations

The researcher recommends integrating best practices for both usability and visibility, emphasising a user-centred approach that considers the specific needs and preferences of the target audience. Key usability practices include:

5.3.1 User-Centred Design

Prioritise intuitive navigation and accessibility, ensuring that the website is easy to use for people of all abilities. The design should cater to the user's journey, with clear pathways to essential content and actions.

5.3.2 Responsiveness

Optimise websites for performance and usability across a variety of devices and screen sizes, ensuring a seamless experience on mobile, tablet, and desktop devices. This also includes optimising page load times to reduce bounce rates.

5.3.3 Accessibility of Key Actions

Ensure that essential actions, such as calls to action, contact information, and navigation menus, are prominently displayed and easy to access, reducing the cognitive load on users.

5.3.4 Continuous User Testing

Conduct regular usability testing with real users, focusing on iterative improvements based on feedback. This can help identify potential issues early and provide actionable insights to refine the design.

For visibility, the following best practices are recommended:

5.3.5 Effective SEO Strategies

Implement a comprehensive SEO strategy that includes on-page and off-page optimisation techniques, keyword research, and content optimisation to improve search engine rankings.

5.3.6 High-Quality, Relevant Content

Regularly update the website with valuable, informative, and engaging content that resonates with the target audience. Content should be optimised for both search engines and users.

5.3.7 Internal and External Linking Strategy

Build a robust internal linking structure that enhances navigation and boosts SEO performance. Additionally, pursue external backlinks from reputable sources to increase domain authority and visibility.

5.3.8 Investment in Professional SEO Tools

Utilise advanced SEO tools and analytics platforms to track performance, identify opportunities for improvement, and gain insights into competitor strategies. This can provide a significant advantage in the competitive online landscape.

It is essential to involve all stakeholders, including SEO specialists, usability experts, and website custodians, throughout the design and development phases. This collaborative approach ensures that the website not only meets usability standards but also achieves optimal visibility. By aligning these strategies with the organisation's overall goals, stakeholders can create a cohesive and effective web presence that enhances user experience and boosts online discoverability.

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APPENDICES

6.1 Appendix A: Online questionnaire

A comparative analysis of usability and visibility of websites of universities in Africa.

Thank you for agreeing to consider participating in this survey. I will be grateful if you take to read the information below carefully and please feel welcome to contact me if anything is unclear.

The study is part of a MICT qualification at CPUT.

1. What is the purpose of the study?

The purpose of the study is to analyse the correlation between the degree of usability and the visibility rankings of a sample of websites of African universities.

2. Who is running this survey?

This survey is being carried out by Hans-Randy Masamba (MICT student at CPUT) who is supervised by Professor Melius Weideman and Doctor Wilhelm Rothman.

3. What will I be asked to do in this study?

You are required to test the user-friendliness of given university websites and describe your experience in the next section.

The tasks to perform are as follows:

- Go to the university website and see if you can find admission requirements for a program of your choice.
- Find out whether it is possible to do an online registration.

Please keep in mind that there are no right or wrong answers, your honest opinion is highly appreciated.

University websites:

- University of Cape Town [https://www.uct.ac.za/]
- Cairo University [https://cu.edu.eg/Home]
- Makerere University [https://www.mak.ac.ug/]

4. How will my confidentiality and anonymity be protected?

The information collected through the questionnaire will be used only for the purpose of this research project. Following graduation, responses will be erased.

All transcripts will be fully anonymised and information that gives any clues to your identity will be removed. The name or any other details of the participant will not be published at all.

5. Can I withdraw from the study?

You will be free to withdraw at any time during the survey. If you decide to withdraw you will not be asked to provide any reason why. Once you have completed and agreed to submit the questionnaire you will no longer be able to withdraw your answers.

Contact details

Should you wish to contact the researcher, you may do so at the following:

214333868@mycput.ac.za or hansrandy.masamba@outlook.com

Please note that emails are only used to check who has completed the questionnaire. Personal details are not published.

* Indicates required question

1. Email *

    _____

2. 1. Which device did you choose to perform this test? *

    Mark only one oval.

    ( ) Tablet

    ( ) Phone

    ( ) Laptop / Desktop computer

3. 2. Please specify the program you will look for in each university website (e.g: *
    Mechanical Engineering)

    _____

65

Usability evaluation of university website #1

You are evaluating the university website of the University of Cape Town

Please right click on the URL below and open a new window

https://www.uct.ac.za/

Look for the selected program on the website and answer the following questions

4.   3. You were able to find the admission requirements related to the selected program.

Mark only one oval.

◯ Strongly disagree

◯ Somewhat disagree

◯ Somewhat agree

◯ Strongly agree

5.
    4. Users have the ability to do online registration for this program.

Mark only one oval.

◯ Strongly disagree

◯ Somewhat disagree

◯ Somewhat agree

◯ Strongly agree

66

6.

5. You are confident that you can re-perform the same actions without any assistance.

Mark only one oval.

◯ Strongly disagree

◯ Somewhat disagree

◯ Somewhat agree

◯ Strongly agree

7.   6. How would you rate the university website on the following? *

Mark only one oval per row.

	Very good	Good	Fair	Poor	Very poor
Usefulness of information	◯	◯	◯	◯	◯
Overall appearance	◯	◯	◯	◯	◯
Page layout	◯	◯	◯	◯	◯
Page load time	◯	◯	◯	◯	◯
Overall ease of use	◯	◯	◯	◯	◯
Ease of navigation	◯	◯	◯	◯	◯
Ease of finding information	◯	◯	◯	◯	◯

Skip to question 8

67

Usability evaluation of university website #2

You are evaluating the website of Cairo University

Please right click on the URL below and open a new window

https://cu.edu.eg/Home

Look for the selected program on the website and answer the following questions

8.   7. You were able to find the admission requirements related to the selected program.

Mark only one oval.

◯ Strongly disagree

◯ Somewhat disagree

◯ Somewhat agree

◯ Strongly agree

9.

8. Users have the ability to do online registration for this program.

Mark only one oval.

◯ Strongly disagree

◯ Somewhat disagree

◯ Somewhat agree

◯ Strongly agree

68

10.

9. You are confident that you can re-perform the same actions without any assistance.

Mark only one oval.

◯ Strongly disagree

◯ Somewhat disagree

◯ Somewhat agree

◯ Strongly agree

11.   10. How would you rate the university website on the following? *

Mark only one oval per row.

	Very good	Good	Fair	Poor	Very poor
Usefulness of information	◯	◯	◯	◯	◯
Overall appearance	◯	◯	◯	◯	◯
Page layout	◯	◯	◯	◯	◯
Page load time	◯	◯	◯	◯	◯
Overall ease of use	◯	◯	◯	◯	◯
Ease of navigation	◯	◯	◯	◯	◯
Ease of finding information	◯	◯	◯	◯	◯

Skip to question 12

69

Usability evaluation of university website #3

You are evaluating the website of Makerere University

Please right click on the URL below and open a new window

https://www.mak.ac.ug/

Look for the selected program on the website and answer the following questions

12.   11. You were able to find the admission requirements related to the selected program.

Mark only one oval.

⬭ Strongly disagree

⬭ Somewhat disagree

⬭ Somewhat agree

⬭ Strongly agree

13.

12. Users have the ability to do online registration for this program.

Mark only one oval.

⬭ Strongly disagree

⬭ Somewhat disagree

⬭ Somewhat agree

⬭ Strongly agree

70

14.

13. You are confident that you can re-perform the same actions without any assistance.

Mark only one oval.

◯ Strongly disagree

◯ Somewhat disagree

◯ Somewhat agree

◯ Strongly agree

15.   14. How would you rate the university website on the following? *

Mark only one oval per row.

	Very good	Good	Fair	Poor	Very poor
Usefulness of information	◯	◯	◯	◯	◯
Overall appearance	◯	◯	◯	◯	◯
Page layout	◯	◯	◯	◯	◯
Page load time	◯	◯	◯	◯	◯
Overall ease of use	◯	◯	◯	◯	◯
Ease of navigation	◯	◯	◯	◯	◯
Ease of finding information	◯	◯	◯	◯	◯

Skip to question 16

71

Final section

Please answer the last question

16.   15. Which university website was the most user-friendly? *

Mark only one oval.

⬭ Cairo University

⬭ Makerere Univeristy

⬭ University of Cape Town

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72

6.2 Appendix B: Ethical clearance

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17 March 2022

Mr Hans-Randy Masamba
c/o Department of Information Technology
CPUT

Reference no: 214333868/2022/7

Project title: *A comparative analysis of usability and visibility of websites of universities in Africa.*

Approval period: 17 March 2022 – 31 December 2023

This is to certify that the Faculty of Informatics and Design Research Ethics Committee of the Cape Peninsula University of Technology approves the methodology and ethics of Mr Hans-Randy Masamba (214333868) for Master's in ICT.

In the interest of transparency, the ethics committee advises the applicant to inform the institutions whose websites they are studying about their research.

Any amendments, extension or other modifications to the protocol must be submitted to the Research Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Dr Blessing Makwambeni
Acting Chair: Research Ethics Committee
Faculty of Informatics and Design
Cape Peninsula University of Technology