A WEBSITE EVALUATION TOOL: CASE OF THE UNIVERSITY OF EASTERN AFRICA, BARATON

BY

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DECLARATION

DECLARATION BY THE CANDIDATE:

I, Nyamwamu Roseline Wangui N., hereby declare that this thesis is my original work and has not been presented for a degree in any other University. All sources used or referred to have been documented and recognized. No part of this thesis may be reproduced without the prior written permission of the author and/or Moi University.

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DEDICATION

This thesis is dedicated to
My loving and caring husband, Isaiah

My children, Brian, Brianah and Bravin.

And all those who took their time in making me realize this dream.

ABSTRACT

A website plays a pivotal role in diverse application domains and more especially in education. In this regard the degree of quality of service delivered and user satisfaction in the usage of such websites is of major concern for many institutions of higher learning in Kenya. This study therefore, focused on assessing the quality of service of the University of Eastern Africa, Baraton website application.The aim was to develop a software tool that would automatically solicit feedback from the website users on the quality of the website. A review of Literature shows that existing quality evaluation models are not largely used due to their poor structured characteristics and non domain specificity.The objectives of the study were: To determine the level of satisfaction of the users by the services offered by the UEAB website application based on the research parameters; To determine the users' assessment and opinions on the current website; To determine how the users' prioritize the attributes of a good website; To determine the limitations of the base model in assessment of institutional websites; To make recommendations for improving service delivery and user satisfaction of the UEAB website; To develop a software tool that can be used to evaluate the quality of the UEAB website application.The study adopted the Unified Theory of Acceptance and Use of Technology (UTUAT) which was integrated with a web application model (WAM). The study adopted a quantitative case study research design where systematic and simple random sampling techniques were used to determine the study sample from a population of 2218 website users. In determining the sample size, the researcher adopted Slovin's formula. The sample size comprised of 401 participants of whom 240 were students, 80 faculty (teaching staff) and 80 staff (non teaching staff). Questionnaires were used as the data collection tools. Data was collected from the main users of the website who were expected to give sufficient and accurate information and these included the students, teaching staff and non teaching staff at the main campus. The data was then coded, classified and summarized with the use of Statistical Package for Social Sciences (SPSS). The results from the case study indicated that the base model used to assess the website was effective even though the comprehensive framework used to design the assessment tool would give broader results from users' perspectives. As a result of the findings, a Website Assessment Tool (WAT) was developed using the iterative design. The prototype developed was tested using actual data and the output matched the expected output even though improvements have to be done over time. The researcher recommends frequent assessment of the website since it is not a one time task; hence, using the automated tool presented in this study will make frequent assessments possible and easier. This will help web designers and webmasters create quality website with improved electronic services and improve the image of the organization on the internet. In conclusion, the assessment of the UEAB website showed that the website offers good quality services in terms of functionality, usability and content. Efficiency and security were of moderate quality while reliability and availability scored lowest.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA - Analysis Of Variance
CSS - Cascading Style Sheets
DFD - Data Flow Diagram
FAQ - Frequently Asked Questions
FERPA - Family Education Rights and Privacy Act
HTML - HyperText Markup Language
HTTP - Hypertext Transfer Protocol
ICT - Information and Communication Technology
IT - Information Technology
ITS - Information Technology Services
ISO - International Organization for Standardization
PHP - General Purpose Scripting Language
SPSS - Statistical Package for Social Sciences
TAM - Technology Acceptance Model
UEAB - University of Eastern Africa, Baraton
U.S. - United States
UTUAT - Unified Theory of Acceptance and Use of Technology
WAM - Website Application Model
WAT - Website Assessment Tool
WBA - Web Based Applications
WBIS - Web Based Information Systems
WebApp - Web application
WebQEM - Web Quality Evaluation Method
WWW - World Wide Web

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Introduction

Websites have become key components of an organization's survival in the globalized competition. The website represents an organization as a whole, communicating its culture, values, and vision to the rest of the world. It acts as a delivery mechanism for services that facilitate various tasks a stakeholder needs to perform. The website also serves as a platform through which an organization interacts with its stakeholders (Chingang & Lukong, 2010).

1.1 Background Information

The growth of internet, intranet and the World Wide Web has had significant impact in all sectors. The internet has become a very important strategic weapon in today's competitive business environment (Vida & Jonas, 2011). Complex distributed application keep emerging in the web environment due to its popularity and nature of information represented through the interlinks. For any organization, the website gives access to a large audience and improves operational efficiency (Ahmet & Aykut, 2012).

Website applications development has experienced tremendous changes and growth brought about by new services and devices. It is evident that websites are emerging as a key component of an organization's survival in our ever globalized and competitive world. While good quality internet service reduces the cost of services and absorbs more customers (Babak et al., 2012), as the dependency on web technology increases, there is need to assess the factors associated with website success as well (Layla & Emad, 2008).

Besides the rapid growth of use of the internet and its connectivity, Manyika & Roxburgh, (2011) indicatethat the implications of the web-based applications are being felt in many other areas of organization which includes higher leaning institutions setting. The consumers' experience on a website is increasingly becoming an important topic both in academic and for organizations using websites to market their products and services (Nagpal et al., 2013).

The assessment of the quality of websites based on users or customer satisfaction is fundamental to obtaining and maintaining success of services offered over the internet. It is rewarding to any institution when quality is improved in the eyes of the website users (Ueliton da Costa et al., 2011).

Website application quality is a complex, multi dimensional attribute involving correctness, reliability, usability, accessibility, security, performance, and conformance to standards. The dynamic nature of the current website environment and of the internet in general, means that applications evolve very rapidly, as does the environment in which they run (Shirlee-ann & Janice, 2005). Some methods provide direct support for the evolution of web applications or provide support for tracing design decisions at various levels, easing the maintenance problem.

However, website assumes a growing importance in such diverse application domains such as in business, education, government, industry, and entertainment heightening concerns about the quality of services and quality of delivered web-based applications. It is necessary to have not only robust development methods to improve the building process but also consistent ways to measure and evaluate intermediate and final products as well (Olsina et al., 2011).

According to Bai et al., (2008) usability dimension has been used to better examine the consumers' perception of the website. In a traditional non web-based system, clients will just use a product with poor usability with a hope that the next release of the software or the next time they use the software the problem would be fixed. There is never a second chance to getting usability right on a website application once users find it unacceptable and with the same errors or mistakes.

The popularity of educational websites is increasing day by day as it provides' the student and other users an information platform where they can access the information and perform other various education related activities. A website offers a means by which web based applications can be accessed. In higher leaning institutions, web based applications would include, the library system, e-learning system, student management information system and registration systems. A website gives an organization an audience beyond the walls and the traditional users of their institutions. A higher leaning institutions' website acts as a means of shaping its images as well as a channel of communicating with various stakeholders such as students, faculty, administrative staff and visitors (Ahmet & Aykut, 2012). Universities need to do everything within their power to keep a positive image with their various constituents. One way to do this is by making use of the opportunities that website provide.Therapid growth of website applications increases the need to evaluate the existing websites.

1.1.1UEAB Background Information

UEAB is a private chartered higher leaning institution in Kenya that was established in 1980 and chartered by the government of Kenya in 1991. Like any other higher learning institution in Kenya, the university has a website which is a platform where

one can find information about the institution. The website is managed by the Information Technology Service department (ITS), which is in charge of ensuring that the website represents the institution.

The UEAB website offers quite a number of web based services which include news and information. It also offers access to services on the e-learning portal, registration and library system to users ranging from faculty, students and staff. The UEAB web master is in charge of the university website. Preliminary investigations indicated that the web master makes changes on the website depending on his opinion and occasionally based on feedback from concerned users. The university doesn't have a criterion in place which the web master can use to assess the website so as to make it more effective and efficient in meeting the customers' needs. The information policy available is not clear on the criterion of assessing the website. The webmaster could be biased in making changes on some areas that he/she deems important.

1.1.2 Higher Learning Institutions Websites in Kenya

In Kenya, more and more schools, colleges and universities are aware of the importance of having a website or an online presence. By this, the higher learning institutions not only serve the potential students, but also the teachers and staff, alumni, parents and the current students as well. The function of the websites is not only to offer information's about their courses and their curriculum, but about current campus activities as well as outreach programs, scholarships and student support-services. The consumers of such services would include the students, their parents, financial supporters, donors, employers who in one way or another are influenced by the universities activities (Lidia et al., 2012)

Today many higher leaning institutions understand the magnitude of having an online presence and hence designing websites for higher learning institution has become a highly specialized field. Designing an educational website involves creating a website that is not only functional but is eye-catching, informational and dynamic as well.

Nyambega, (2010)evaluated some institutions' websites in Kenya and the results in his report indicated that, the *Masinde Muliro University of Science and Technology* (MMUST) website had events which were not frequently updated. The assessment indicated that most of the university webpages have a series of grammatical mistakes. The evaluation further indicated that the news update was not frequently done. Other websites like the *St Paul's University* and *Kiriri Women's University* had some events which were still on the website yet they had already taken place.

Nyambega,(2010)goes on to mention that if one happens to be looking for a piece of information on most university websites in Kenya, it could take long hours on end of waiting only to be answered with a "Server-not-found" message. On the use of shape and user friendly fonts, some of the universities use horrific shapes and fonts, which may be termed as a mockery of creativity. On other websites, the fonts are too small for comfortable reading. As much as universities are supposed to generate content, not all of it is to be posted online. The *University of Nairobi* and *Kenyatta University* were noted to have overwhelming information on-line.

The importance of online presence for higher education institutions is stated by the existence of *4 International Colleges &University* (4ICU) which is an international higher education search engine and directory reviewing accredited University and Colleges in the world. The aim of this website is to provide an approximate popularity ranking of work Universities and Colleges based upon the popularity of their

websites. This is intended to help international students and academic staff to understand how popular a specific university is in a foreign country. The ranking has been based on an algorithm extracted from three different search engines which include; *Google Page Rank, Yahoo Inbound Links* and *Alexa Traffic Rank*.

Since the year 2004, *Webometrics* has been used to rank world universities based on the volume of the web content, visibility and the impact of these web publications as per the number of site citations received. According to Webometrics, (2013) in the evaluation of world universities reported that the *University of Nairobi* was ranked 14thin Africa and 1624 among world universities. A report by the 4ICU.org University Web Ranking, (2013) ranked the *University of Nairobi* at 20th place and *Moi University* at 55th position respectively in Africa. In Kenya the ranking results indicate that *University of Nairobi* takes the 1st position, *Moi University* at 4th and *University of Eastern Africa Baraton* at 11th place. However, according to Webometrics, (2014) *University of Nairobi* was ranked at position 9 in Africa and 1167 in the world followed by *Kenyatta University* at position 34 in Africa and 2907 in the world. *Moi University* was not among the top 100 in Africa in this ranking. This indicates that the Kenyan education institutions websites still need some work done on them. In the year 2015, Webometrics ranked the University of Nairobi in seventh position in Africa, 1st in Kenya among public universities while Strathmore emerged the best among the private categories at position 74 in Africa. Older private institutions like Daystar, Catholic University of Eastern Africa, University of Eastern Africa, Baraton, have been edged out by the newly established ones. This raises the question on the volume of research been undertaken by these universities, their online visibility, the economic and job market relevance of the courses the institutions offer.

It is evident from literature that the quality of a higher learning education institutional website has a direct and positive impact on user satisfaction and user satisfaction has a direct and positive impact on use or reuse of software (Bai et al., 2008). However, due to the peculiarities and complexities of website applications, their quality assessment should be adaptable to the new environment and the new testing approaches that are needed (Nagpal et al., 2013).The basis of a sound educational website should be thequality of the website as a package.

The quality of any websites is strongly tied to its ultimate success. Quality is an important issue which could determine the ability of the businesses to reap the benefits of being the only ones offering good services. Websites could be associated with various problems such as incorrect navigation, broken links, reliability, out of web content. Better design and quality are most often achieved through the process of continuous assessment and evaluation of the web-based applications and subsequently making improvements based on those evaluations (Khan et al., 2010).

1.2 Problem Statement

From the above background it is important to determine and measure the quality of a website application. From the literature review several website quality models are introduced that have over the years been used to evaluate the general quality of websites. Most of these models are not largely used due to their poor structured characteristics and non-domain specificity. Further, the quality factors focus on usability features neglecting all the other factors which have some impacts when it comes to meeting user's needs. Assessing the website quality from the users' point of view helps the service providers determine whether the website is meeting its intended purpose for the intended users. User involvement helps in getting rid of

outdated pages which do not meet their changing needs, areas that arepackedwith unnecessary information that confuses them and pages that are saturated with features that do not reflect the their needs. In order to satisfy the needs of the users, institutions need to set up websites that provide quality information and services. An academic institutions website is a gateway to its information, products, and services and as such it should reflect the needs of the clients it serves. There istherefore a need to have a comprehensive automated quality assessment model tailored to a specific domainsthat aid in the assessment of the website quality from different user group perspectives. Preliminary investigations indicate that the website users have specific needs that they expect to be met by the services provided on the website. To measure the quality of the website, the WAM was used to assess the overall satisfaction of the website users in terms of service delivery.The assessment tool could be used to assess the higher learning institutions' website quality and make recommendations to the technical personnel on the features that need to be improved on the website.

1.3 Aims and Objectives

1.3.1 Aim

The aim of the study was to assess the UEAB website in terms of service delivery and user satisfaction using the base model with a view of developing a website assessment software tool.

1.3.2 Objectives

The objectives of this research were;

1. To determine the level of satisfaction of the users by the services offered by the UEAB website applications.
2. To determine the users' assessment and opinions on the current website.
3. To determine how the users prioritize the attributes of a good website.

4. To determine the limitations of the base model in assessment of institutional websites.
5. To make recommendations for improving service delivery and user satisfaction of the UEAB website.
6. To develop a software tool that can be used to evaluate the quality of UEAB university website applications.

1.4 Research Questions

The study was guided by the following questions:

1. What is the level of user satisfaction based on the quality services offered by the UEAB website?
2. What are the users' assessments and opinions on current website quality?
3. How do the users prioritize the attributes of a good website?
4. What are the limitations of the base model in assessing institutional websites?
5. How can a website assessment tool be developed to evaluate the UEAB website?

1.5 Assumptions

The researcher made the following assumptions:

- That the study sample have basic computer literacy, including using computers to navigate their way around the internet
- That the users did not consider technical aspects to be significant factors in the quality of service provided by the institution website

1.6 Significance of the Study

The study sought to develop a software tool that can be used for the assessment of institutions of higher learning websites. The technical staff in charge of website

services will benefit from this software tool for it will provide means by which they can establish the strengths and weaknesses of the website, leading to appropriate improvements needed in the website application. This tool can also be adopted in other institutions to gauge and improve on their website applications.

The research will make a significant contribution to the body of existing knowledge in the development of website applications, acquisition and implementation.

1.7 Scope and Limitation of the Study

This section presents the scope and the limitations of the study.

1.7.1 Scope

This study focused mainly on the University of Eastern Africa, Baraton website. It basically concentrated on the website users who include nonteaching staff, students and the teaching staff of the institution. Other potential users of the UEAB website for example visitors, alumni and prospective students were not involved in this study. The study specifically assessed the UEAB website quality in terms of service delivery and user satisfaction.

1.7.2 Limitation

Factors such as time, financial constraint and location were taken into consideration in choosing the area of study. The researcher did not involve website users in the university's satellite campuses since users at the main campus were expected to give sufficient feedback.

1.8 Chapter Summary

In this chapter, the background, significance and the aim of study have been discussed by the researcher. The researcher has also identified the objectives that guided the study, the scope and the limitations of the study.

1.9 Definition of Key Terms

Assessment/Evaluation: These words have been used interchangeably to mean the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understand of what the website users know or would want

Consumer /user/customer: these are words that have been used interchangeably to mean the people who use the website applications

Criteria: A standard on which judgment can be based on

Parameters/Attribute: The research criteria that has been applied in the study

Quality: Quality includes: conformity to user expectations, conformity to user requirements, customer satisfaction, reliability, and level of defects present. Context and policy will decide the best definition for a given situation.

Software: This is a general term that has been used to refer to programs that are generally used to operate the computer

Website: A Website is a collection of Web pages which typically are coherent such as from one organization.

Web Application Model: A series of attributes that contribute to the quality of a good website from Olsina.

Web Based Application: This is an application that is usable only with an active internet connection which uses HTTP as the communication protocol and can be accessed through a website.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter discusses literature relevant to this study. It presents the overview of various assessment models that have been used, the importance of quality on any given website and the various key factors that have been considered important to any website. This section plays an important role in the identification of gaps between the existing literature and the current study which needs to be filled out by this study. The review focuses on the variables from the theoretical framework. Previous studies have focused on one characteristic or two aspects of the website using different constructs, usability being the most commonly used aspect of website assessment (Ahme & Aykut, 2012).

2.1 Overview of Quality Assessment Models

This section presents the literature review and previous website evaluations tools. These tools provided a deep insight on the quality attributes that are suitable for assessing education institutions' website.

In a global and increasingly competitive market, quality is a critical success factor for all aspects of economical and organizational success. This is particularly important in any system or information systems (IS). Developing and selecting high quality software applications is fundamental. Bygren et al. (2013) assert that the quality of software means conformance to the requirements of the software product's users and other stakeholders. The more closely a software product conforms to these requirements, the higher its quality. It is important that the software applications can be evaluated for every relevant quality characteristic using validated evaluation

criteria. End- users have become savvier to their technological needs over the years and view technology as a basic utility. When technology is made available, it must be efficient, fast and user friendly with excellent customer services (Komiyama, 2011).

Several models have been proposed for evaluating quality service delivery on websites of which they have a varied theoretical foundation (Ueliton da Costa, 2011). Such models include the *e-ServQual, e-qual, WQM, SERVQUAL* and *WebQual*.Web Qualevaluation model has been used to evaluate consumer perceptions that base themselves on the premise that the quality of a service is measured by the comparison between the expectations and the perceptions of the user or consumer (Eleanor et al., 2007). This model addresses information systems and consumer communication effectiveness and thus stands as a significant contribution to current service delivery and quality literature.

Hyejung et al., (2013) using a modified e-ServQual instrument with additional measures for value, trust and loyalty carried out a study from which the result indicate that website quality has a strong impact on loyalty via perceived value and trust on users' side. Five subcomponents of the e-ServQual identified and tested in this study (design, responsiveness, information, security and usability) appeared appropriate for measuring the service quality of information and interaction oriented websites as statistical validity and reliability are supported.

Eleanor et al., (2007) asserts that the experience quality evaluation model (E-QUAL) assesses experience quality for each service encounter and examines whether or not the service providers and the customers or users achieve mutualism and adaptability. For mutualism, the model assesses service performance to judge whether there is any relationship that develops from the user of the service. For adaptability, the model

estimates the interactive fitness of service-users to determine whether they have sufficiently evolved to achieve value co-production. Leveraging the service delivery process is a key to meeting value co-production and fulfilling service innovation. Nevertheless, this model cannot apply to all kinds of service systems but it can be viewed as a reference model for service quality management.

WebQEMis a tool that has been used to objectively evaluate the website applications according to Adrian et al., (2010). This model has been used to assess how web applications help to meet quality requirements in new web development projects and to evaluate requirements in operational phases. It helps discover absent attributes or poorly implemented requirements, such as interface-related designs, and implementation drawbacks or problems with navigation, accessibility, search mechanisms, content, reliability and performance, among others. The WebQEM evaluation is a tool that is evaluator- driven, done by the domain experts rather than the users. This method is more objective than subjective and it is quantitative and model centered (Khan et al., 2011). However, the definition and specification of quality requirements must be identified for the evaluation process. This tool has general characteristics and can be useful in evaluating diverse application domains according to different user views and evaluation goals (Olsina & Rossi, 2013)

Vida and Jonas, (2011) present the Web Quality Model (WQM), which is intended to evaluate a Web application according to three dimensions: Web features (content, presentation, and navigation); quality characteristics based on the ISO/IEC 9126- 1 (functionality, reliability, usability, efficiency, portability, and maintain ability); and lifecycle processes (development, operation and maintenance) including

organizational processes such as project management and reuse program management. Using a these dimensions they classified 385 web metrics.

The SERVQUAL model is used as the main concept to assess service quality and customer satisfaction (Chingang & Lukong, 2010). This means that customer satisfaction could be measured using the various service quality dimensions. SERVQUAL model is an empirically derived method that has been used by a services organization to improve service quality. The method involves the development of an understanding of the perceived service needs of target customers. These measured perceptions of service quality for the organization in question, are then compared against an organization that is "excellent". The resulting gap analysis may then be used as a driver for service quality improvement. Chingang & Lukong, (2010) further indicates that SERVQUAL originally had five service quality dimensions which included *Tangibles, Reliability, Responsiveness, Assurance and Empathy*. This model was later modified and adapted to cover ten dimensions of quality service: *Tangibles, Reliability, Responsiveness, Competence, Courtesy, Credibility, Security, Access, Communication and Understanding the customer*. This model takes into account the perceptions of customers and the relative importance of service attributes which are prioritized by the organization so as to improve the most critical service attributes. However, SERVQUAL by itself is useful to service managers but will not give a clear picture of needs, expectations and perceptions in a service organization context. Service organizations are accountable and responsible to the citizens, communities as well as to customers and service users.

The quality of software products can be described in terms of quality characteristics as defined in the ISO/IEC 9126-1 standard. Komiyama, (2011) expounds on the

ISO/IEC9126-1 where quality is defined as “the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs”. However, the state of the art in software measurement is such that, in general, the direct measurement of these characteristics is not practical. However, it is possible to assess these characteristics based on the measurement of lower abstraction attributes of the product”. The ISO 9126-1presents a quality model that describes six categories of software quality which are relevant during product development that include functionality, reliability, usability, efficiency, maintainability and portability. According to Anusha R.,(2014), a comprehensive website evaluation methods is required to address common quality elements of web applications even though these elements vary for different kinds of websites.

According to literature search, the quality assessment tools presented in this chapter in one way or another consist of similar characteristics. Some of the models focus on particular attributes while others have broad level quality characteristics that are difficult and vague to measure. These quality models provide a general conceptual framework which can be aggregated to quality characteristics that have measurable properties that quantitatively can be measured given the peculiarities of websites. This provides for sound foundation for defining quality characteristics in any domain under consideration.

2.2 An Overview of the Website Application Model Used

This research is concerned with the key issue of website quality. The concept of quality is multi-faced. Users of a website are interested in the quality in use, which is mainly an external characteristic, but on the other hand developers and managers are more concerned with issues like maintainability, portability, cost effectiveness, which

are mainly related to internal quality. In assessing the UEAB website the study adopted the web application model(WAM) by Olsina (Pressman, 2010) where specific parameters that directly influence the external users of the website were integrated with UTUAT theory in assessing the quality of the website application. The WAM is used as the base model of this study. The quality attributes included usability, functionality, reliability, efficiency, maintainability, security and availability. The determination of the quality lies on the importance of the attributes concerns from the user's point of view. It is evident that the importance of the various attributes in one website domain may be different and an attribute in one website domain may have different importance in different website domains. Thus, a good website should empower its users to perform some actions that will benefit them despite their diverse experiences, backgrounds and needs. The UEAB website was evaluated using the users' point of view as websites are generally evaluated from the users' standpoint, thus considering external quality.

2.3 Theoretical Framework

This study was guided by the Unified Theory of Acceptance and Use of Technology (UTAUT) and the efficient use of ICT in service delivery which has been derived from the Structure of the excellent Public Institutions theoretical model (S-EPI).Venkatesh et al.,(2003)proposed this model which synthesizes eight existing models of technology acceptance. According to Venkatesh et al.,(2003) UTUAT extends TAM by taking into account additional constructs which include performance, expectancy, effort expectancy and social influence which influence significantly the behavioral intention and the ultimate usage of technology. Venkateshet. al.,(2003, 447 – 453) defines these constructs as follows:

Performance expectancy *- "...the degree to which an individual believes that using the system will help him or her to attain gains in job performance."*

Effort expectancy *- "...the degree of ease associated with use of the system."*

Social influence *- "...the degree to which an individual perceives that important others believe he or she should use the new system."*

Facilitating conditions *- "...the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system."*

Venkateshet.al.,(2003) asserts that UTUAT has been given regard to technology usage behavior and it has been found to be the most effective model compared to the other models. It has successfully been used in the various studies on the use of information systems such as in mobile commerce (Carlsson et al., 2006; Ming-Hong Siao, 2006)online learning(Yi-Yuan Zeng, 2005) and wireless network (Hong-Chang Zhang, Cang-Yi Guo,Mei-Chi Lai, 2004). UTAUT provides a useful tool for managers needing to assess the likelihood of success for new technology introductions and helps them understand the drivers of acceptance in order to proactively design interventions (including training, marketing, etc.) targeted at populations of users that may be less inclined to adopt and use new systems.

Pressman (2010) presents some web application models that have been used to assess the quality of web applications. Of interest to this research are the Olsina quality requirement tree and the extension of these by Offut. Olsina uses a set of technical attributes which include usability, functionality, reliability, efficiency and maintainability as key contributors of high quality web applications. Offut extends these attributes by considering additional attributes which include security, availability, scalability and time-to-market.

According to UTUAT, the behavioral intention of a user is influenced by the individual's conscious act on the decision on whether to accept or adopt the technology. The website users decide to use or to come back and use the services provided by the website thus affecting the users' behavior. UTAUT theory was used as the theoretical foundation for this study since the study problem deals with the user's desire for satisfaction in the service delivery and how it affects the user's behavior to use or not to use the website. The researcher adopted constructs that have direct influence on the external users of the website which include usability, functionality, reliability, efficiency, security, availability and content and integrates these constructs with the UTUAT model.

2.4 Conceptual Framework

According to available literature and the adapted theory, a set of attributes (dependent variables)were found to influence the quality of an academic institutions' website. These attributes can influence the development and implementation of a website with an objective of meeting the user's needs and can also influence the behavior of the users of the website. The conceptual framework indicates that there is a relationship between the various attributes that affect service quality(independent variable) of a website. If the service delivered satisfies the user, then the user will always come back to the website seeking more information or services thus the user behaviour on the level of satisfaction of the website can have influence on the quality of the website.

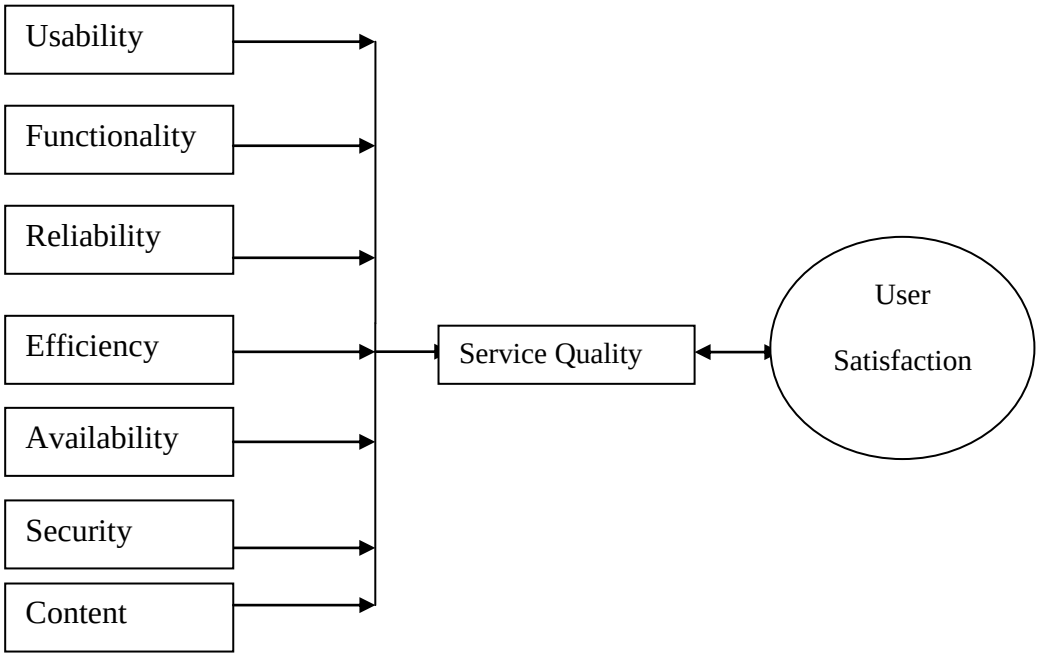


Figure 2.1: Website Assessment Framework

***(Source: Modified from Pressman, 2010, Venkatesh,* 2003)**

This framework illustrates the integration of the quality attributes of a good website application from Pressman, (2010) and the UTUAT model by Venkatesh et al., (2003), where Venkatesh et al., asserts that service delivery influence significantly the behavioral intention and the ultimate usage of technology.

The organization as an entity should be committed to offering quality services to their customers. The customer's needs ought to be satisfied by service offered for them.And so if the website application meets the needs of its users they would reinforce satisfaction with it and if the users' needs are not met, the users will look for satisfaction elsewhere. Customer satisfaction results from a global evaluation of all the aspects that constitute consumer relationship whereby the consumer shows a favourable attitude. The concept of customer satisfaction occupies a central position in marketing thought and practice (Ahmet & Ertan, 2010). They further argue that

satisfaction is important to the individual consumers or customer of any service because it reflects a positive outcome from the outlay of scarce resources and/or the fulfilment of unmet needs. From literature review, it is agreed that satisfaction in a given situation is the sum of one's feelings or attitudes toward a variety of factors affecting that situation.

2.5 Service Delivery

Chingang & Lukong, (2010) defines service quality is generally as the overall assessment of a service by the customers or the extent to which a service meets customer's needs or expectations. A service is a means of delivering value to customers, by facilitating outcomes customers want to achieve without the ownership of specific costs and risks. Service has been described to have four unique characteristics which are intangibility, inseparability, heterogeneity and perish-ability which make services different from physical products (Parasuraman, 2005). These characteristics are determinants that influence service quality as perceived by a consumer. Thus, a service must be well defined by the provider in terms of its characteristics in order to understand how service quality is perceived by consumers.

Services are said to be intangible thus they can't be seen, tasted, felt, heard or smelled before they are purchased. The advance in technology and increased use of internet has great impact on services delivery. The interaction between consumer and service provider is very important when measuring service quality because through that interaction, the service provider could easily understand the consumer better and identify what he/she exactly wants (Chingang & Lukong, 2010).

Myunghee, (2009) asserts that the internet has made it possible for service providers to show more additional services like frequent updating of information, easy navigation, accurate information and speedy response to customer needs. It has also made services more easily customized making the customers more active. However, delivery of service on a website is important in gratifying the preferences, perceptions and expectations of the customers.

It is important therefore to understand the users essential needs and hence be able to measure their satisfaction. Myunghee,(2009) further indicates that the basic customer delivery services consists of inderstanding what the users need which can be done through frequent assessmentand evaluations of user satisfaction. Thususers play a very important role in service improvement hence service improvement is a commitment of ongoing listening to users and allowing them to input in service improvement process. Service quality is an ingredient of service delivery and so it improves service delivery.

According to Chingang & Lukong, (2010), it is very important to measure service quality because it allows for comparisons before and after changes, identifies quality related problems, and helps in developing clear standards for service delivery. Literature search indicates that providing good service quality to customers retains them, attracts new ones, enhances corporate image, positive word-of-mouth recommendation and above all guarantees survival and profitability, Negi, (2009); Ladhari, (2009).

2.6 Service Quality and Web-Service Quality

The website interfaces the services with the users or clients and its impact is relevant inthe manner in which the service is delivered to the users or customers. Service

quality through a website is an essential strategy to success. To deliver superior service quality, top management with web presence must understand how users perceive and evaluate those services (Chingang & Lukong, 2010).

Service quality is commonly noted as a critical prerequisite and determinant of competitiveness for establishing and sustaining satisfying relationships with customers or clients. Service quality is an important indicator of customer satisfaction (Ueliton da Costa et al., 2011). If the management of an organization pays attention to service quality, it can lead the organization gaining a lasting competitive advantage.

Bai et al., (2008) defines web service quality as the extent to which a service meets users/consumer's needs and expectations. Service quality has also been defined as the difference between consumer expectations of service and perceived service (Parasuraman, 1985). Consumer dissatisfaction will occur if the expectations are greater than performance, then perceived quality is less than satisfactory. The end-users' satisfaction is an important aspect in research which considers the significant factor of measuring the IS/IT success and use. Ahmet & Ertan, (2010) suggest that service quality can be defined as the difference between customer's expectation for service performance prior to the service encounter and their perception of the service received. Customer's expectation serves as a foundation for evaluating service quality because, quality is high when performance exceeds expectation and quality is low when performance does not meet their expectation.Literature research cites Delone & McClean's, (2003) which is an updated IS success model. The model is concerned with quality and service quality which were uploaded into it. Delone & McClean, (2003) identified information quality and system quality as antecedents of customer or end-user satisfaction.

Quality has been defined from different perspectives and orientations. According to Angela & Christopher, (2009), quality is distinct according to the person making the definition, the measures applied and the context within which it is considered. They cite various definitions of quality as “excellence” (Peters & waterman, 1995) “value” (Feigenbaum, 1995), “fitness for use” (Juran & Gryana, 1988), “conformance to requirement” (Crosby, 1979) and meeting and/or exceeding users expectations” (Parasuraman et al., 1985). Users always demand for quality and their resultant behavior is replicated in terms of an attitude towards the products consumption i.e. number of visits to the site, which has led researchers and analysts to regard quality as a single most important factor for long term success and survival (Vida & Jonas, 2011). Thus, quality aims at the needs of the user at present and in the future.

Quality is differentiable and stem from the expectations of users or consumers. Hence, it is necessary to identify and prioritize expectations for service and incorporate these expectations into a process for improving service quality (Chingang & Lukong, 2010). Implementing and evaluating service quality is a very complex process. There are two aspects that need to be taken into consideration when evaluating service quality, which are content and delivery of service. Customer satisfaction as transaction specific means that consumers get satisfied with a specific aspect of service while perceived service quality is a global judgment or attitude to a service.

Negi, (2009) clearly points out that overall service quality is significantly associated with and contributes to the overall satisfaction of customers. Customer satisfaction is based on the level of service quality delivered by the service providers which is determined by the consumer’s cumulative experiences at all of the points of contact with company. This shows that there is some link between service quality and

customer satisfaction which highlights that importance of customer satisfaction when defining of quality (Wicks & Roethlein, 2009). The same goes for a higher educational institution website where users of the website are in the best position to evaluate the quality of delivery and the relevance of the services offered by the website.

According to Khan et al., (2010) web application meets specific user needs. In turn, by measuring and evaluating external quality, a software product's internal quality can be validated. Similarly, taking into account suitable software/web application attributes for internal quality is a prerequisite to achieve the required external behavior, and to consider suitable software attributes to external behavior is a prerequisite to achieve quality in use.

The ISO,1994 standard, defines quality from three views which include users´ view, developers´ view, and managers´ view. In the academic domain there are three main general audiences regarding the user (visitor) view. This includes current and prospective students (and visitors like parents), academic personnel such as researchers and professors, and research sponsors. According to Babak et al., (2012) the website user would be mainly concerned in using the site such as, its performance, its searching and browsing functions, its specific user-oriented content and functionality, its reliability, its feedback and aesthetic features, and ultimately, are interested in its quality of use. These can be summed up into the research parameters used in the study as; usability, functionality, reliability, availability, security, content and efficiency. It is important therefore to evaluate the level of accomplishment of these characteristics and attributes which gives room for researchers to be able to

analyze and draw conclusions on the state-of-the-art of academic websites quality, from the current students, staff and faculty point of view.

Most websites today are diverse and due to this diversity of websites it is not practical to come up with a fixed model that is applicable to all website applications. According to Khan et al., (2010) the success of a web-based system largely depends on the end-users' satisfaction. This satisfaction is grossly based on the operational quality attributes of the website. According to Mebrata, (2010) web designers usually provide attention to those quality attributes which indicate certain aspects of quality from a designer's point of view but focusing on user-centric operational quality properties is more difficult and challenging. Mebrata, (2010) argues that different users define quality for the same web-based product differently based on their various needs. It is difficult therefore to come up with a fixed model which can be able to address the quality requirements of website applications, since the requirements vary from one institutional website to another.

2.7 Determining Customer Satisfaction

Every successful business organizations tries to ensure that it delivers effective services to its customers and this is virtually a shared goal of all organizations (Nwankwo, 2007). Customer satisfaction assessment is a way or a process of understanding the customers and their needs. Customer satisfaction seeks to meet customer expectations and avoid disappointment. He further observed that simply measuring customer satisfaction does not create customer satisfaction but it provides a necessary method to understanding the factors that contribute and drive to customer satisfaction. Gour & Theingi, (2009) argue that determining customer satisfaction provides focus on how factors or drivers that contribute to satisfaction can be attained

and maintained for a continuous high level of customer satisfaction. For all organizations, particularly academic organizations such colleges and universities, the importance of delivering customer satisfaction is the keystone in satisfying their stakeholders who include; students, faculty, staff, alumni and community.

Customer satisfaction has direct bearing on the service quality. Most research on service quality is spurred by the original work of Parasuraman et al., (1985). They suggest that service quality is based on comparison between what the customer feels should be offered, and what is provided. And so satisfaction comes about as a feeling of fulfilment in what is provided.

2.8 Limitations of Existing Website Evaluation Methods

In order to create a comprehensive website assessment tool that is more effective for institutions of higher learning, some limitation of existing website evaluation methods are pointed out from literature search as discussed below.

Many new website software technologies and rules are not considered in existing quality evaluation methods. Web developers are confused by which technologies to use over the other and the best criteria to apply (Anusha R., (2014). Hence the web developers use the technologies and criteria which suit them and not the users which end up confusing them. Thus, web developers need to consider emerging software technologies is designing assessment tools and consider relevant domain specific criterion.

Quite a number of existing website evaluation methods generally requires the evaluator to have IT background or skills so as to be able assess the qualities in a website. In many organizations, employees and the users of the website vary in their

IT skills. Simple and usable user interface and auto evaluations are necessary in designing website assessment tools.

Web-based applications are becoming more and more complex with changes in technology. Many of existing website evaluation methods evaluates a website's quality generally and not as per its domains (e.g. e-commerce, education, entertainment, etc). It is necessary to create a comprehensive website assessment tool that is domain specific. According to a standard ISO quality model, a comprehensive website evaluation method is required to address quality elements of the web-based applications, but it is important to note that the elements vary for different kinds of websites.

2.9 Adopted Website Quality Attributes

The researcher was guided by the following attributes that are regarded crucial and important by Offut in Pressman,(2010); usability, functionality, reliability, efficiency, availability, content and security with the objective of developing a software tool that has these key attributes. Content was used as an additional factor which is the information provided on the website and has frequently been mentioned in previous studies relating to evaluation of academic websites. Brief descriptions of these attributes are discussed in this section.

2.9.1 Usability

Website usability is concerned with how easy and intuitive it is for individuals to learn to use and interact with a website in order to quickly and easily accomplish their tasks (Adrian et al., 2009).It can also be described as the measure of the quality of a website's presence, as perceived by users (Layla and Emad, 2008).The ISO, (1994) standards define usability as the extent to which a product can be used by specified

users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. The definitions of usability vary but all of them virtually include user's satisfaction. Web applications are increasing in their importance in various domains; thereby, the need for ensuring usability of the web-based applications (Adrian et al., 2009).

A good quality website is important for a number of reasons (Myunghee 2009), competitiveness being the major reason. The website needs to be appealing so as to ensure that people actually stay on it until the transaction is completed (Gour & Theingi, 2009). Ueliten da costa, (2011) states that users of a website often cannot wait to complete their transactions on websites that take too long to respond to their requested services, those that do not facilitate the retrieval of information they are looking for, and those that do not present the information in a well organized and relevant form. The WWW provides access to an increasing range of information, products, and services.

Chingang & Lukong, (2010) suggests that website users range from experts to novices with dramatically different expectations and skills. Thus, it is important to understand the factors that increase website use by different users. Prior research suggests that high usability is associated with user-related positive outcomes, such as are duction in the number of user errors and a more positive attitude toward the website(Eleanor et al., 2007). In terms of interactivity, the website is the interface through which employees and user interact with the organization. The website users must be considered quality actors and critical ones indeed, since they can have a big impact on the global functioning of the site. In that sense, it is analogous to a brick and mortar store (Polillo, 2011). Usability therefore, is akin to a user-friendly and pleasant store

environment and influences the website traffic. Teresa, (2011) asserts that usability gives an impression of a strong customer orientation and services mindedness. Likewise, low usability portrays the opposite of these sentiments.

As discussed above, it is clear that usability is one of the most important characteristics of a website. This has been described succinctly by (Ahmet & Aykut, 2012), who suggests that usability rules the web. If a user cannot conveniently use a website to find a product or service, the user will not use it or buy it, instead they will look for it elsewhere.

2.9.2 Functionality

Functionality involves all the processes and applications that are behind the scene. According to Xin & Weiqi, (2009), functionality entails how the public users interact with the site for services and the site's delivery. They further state that functionality refers to whether the website is functioning as it should be. Various statements have been used to measure a site's functionality which includes: functionality includes all the technical and 'behind the scenes' processes and applications. Thus, functionality of the website entails the site's delivery of interactive services to all end users (Pressman, 2010).This means that the website should do what it is needed to do, while usability relates to the question of how well users can use the function.

2.9.3 Efficiency

According to Teresa, (2011) efficiency deals with the number of clicks that a user makes so as to complete a particular tasks as well as how much time a user takes or how many actions a user will perform to complete a task or reach a particular goal. Information hosted on a website can be classified into static and dynamic content.

Static content can be downloaded by the users containing the information and graphics designed for a page while dynamic content is created by programming languages that can accept the program arguments based on the users' requests made at the time when the user is consuming the services from the web. May & Yen, (2007) define efficiency as the quality or property of being efficient, or the degree to which this quality is exercised. It can be computed as the ratio of the effective or useful output to the total input in any system or the ratio of the energy delivered by a machine to the energy supplied for its operation. Thus while considering efficiency and effectiveness of the web content to satisfy users, it is important to relate the performance measures of individual services to the measures of other services which contains static and dynamic contents. Efficiency is an important skill in avoiding time wasting and effort. It is important therefore to incorporate programming techniques that will make the implementation and maintenance of a website efficient (Soohyung et al., 2011).

2.9.4 Reliability

Pressman, (2010)has cited software reliability definition by Musa, Iannino, and Okumoto in statistical term as "the probability of failure free operations of a computer program in a specified environment for a specified time". This is termed as operational reliability. Operational reliability is an important criterion for any website application that gives services to users. The website must be reliable in the information that it provides to the public. Website software should be designed is such a way that they do not allow an intentional operation failure, wrong information and transaction errors to occur. Kazimierz & Jerzy, (2010), further stresses that reliability is one of the most important factors of web-based software and application.

2.9.5 Availability

There is no question that Website availability plays a major role in meeting the user's needs and so the website should ideally function as expected anytime, anywhere and for any customer or consumer. According to Pressman, (2010), availability is the measure of the percentage of time that a website application is available for use. In reality, unscheduled downtime happens and often times it is due to factors beyond the organization's control. Disgruntled customers always have ripple effects on the use of the website in that the negative experience is shared with other consumers who in turn disseminate the same information to other consumers causing a long-term and at times irreparable damage to the organization (Teresa, 2011). The users should be able to access the website 24/7/365. According to Kazimierz & Jerzy, (2010), argues that apart from the fact that the website must be available 24/7/365, the website must also be accessible to diverse browsers. When downtimes occur, the organization should take effective measures to ensure that downtime is minimized and this will help in maintaining consistent and high rates of the website availability. Availability detects the behavior of the users since users will invariably go elsewhere if the website is not available.

2.9.6 Security

Security is paramount when developing a website application. News articles daily report on security vulnerabilities and hacking attacks of online applications (Kuzma et al., 2010). This has caused consumers or users to be more concerned about misuse of their personal information and many are mistrustful of the security protection that organizations and institutions are employing. Organizations need to devote more resources to protect information on the website. Information security is a top concern

in management, in its various forms, information is arguable the most important asset (Gerber & Solms, 2008). Information helps people in their quest for further information and higher knowledge which is can lead to sound decision making and proper management of tasks and challenges. The rapid growth in web-based applications deployment has created more complex, distributed IT infrastructures that are harder to secure. In the paste, organizations depended upon security measures at the perimeter of the network, such as firewalls, in order to protect IT infrastructures. However, more and more attacks are targeting security flaws in the design of web-based applications, such as injection flaws, traditional network security protection which may not be sufficient to safeguard applications from such threats. In addition (Kuzma et. al., 2010) indicates that the developers of higher institutional website applications need to understand the technical framework when designing and developing website applications, and they need to carefully review the security of their systems before implementing them on the servers.

A website often collects and stores a variety of sensitive, personal information about its customers in order to better serve them in their future visitations (Myunghee, 2009). Accordingly, privacy and security features have become sensitive and serious concerns to website customers. Privacy/Security involves transactional functions, which enable customers to feel the website is intuitive, simple, and user-friendly. Security is one of the key attributes of website service quality dimensions demonstrating trust for users to make transactions online. According to Kazimierz & Jerzy, (2010), online services should be delivered and operated in a reliable and dependable manner to build trust and confidence from customers. They further observe that any breach of a company's website can cause significant revenue losses, large repair loss, legal consequences, and loss of credibility with customers or website

users. However, despite the legal mandates and advice to fully test and develop secure systems; many higher learning institutions are not fully protecting their web users.

Young, (2008b), reports that there are a myriad of computer security threats that universities face, but one of the top one includes malware, a large category which can include infected and insecure code. According to (Waters, 2009), the rise of web-based applications is the number one avenue of malicious hacker attacks. The root of most problems is due to software issues, such as poor coding practices in the applications, and that developers are developing insecure systems. Waters, (2009) further says that the security vulnerability of institutional websites is because of the use of media-based applications. This is increasing in growth especially in school or higher learning institutions where more content and information is accessed online.

Although application developers could easily become the scapegoat for website application systems, school administrators should realize that programmers may not have the knowledge or training or create secure applications, and project managers may value speedy development and functionality over secure systems (Waters, 2009).Thus, higher learning institutions must have clear policies related to information protection. However, even with clear policies, if there is a lack of training of the staff or application developers on the security policies, the institution may still find itself at risk to data theft and security holes within their systems. It is evident therefore, that web-based applications must be able to handle customer data and other electronic information as securely as possible (Kazimierz & Jerzy, 2010).

Security is presented as an attribute by Pressman, (2010) in the Offut model but in the ISO9126-1 it is presented as a sub characteristic of functionality. However in this

study, literature studies indicate that security is an important factor in determining service quality from the users' point of view.

2.10 Content Quality

Content is a critical part of the website. It is the reason as to why users visit the website. Websites are a combination of information, services and other functionalities. Service quality of the website is assessed in terms of the quality of the information, services and its functionalities. This characteristic is not part of the base model but it has been used in previous studies in evaluating academic websites. Websites provide services through the content or information provided on them. The importance of this characteristics has been noted by most authors with a motto "Content is king". Users in academic website come looking for particular information. This is because the users have what they are looking for in mind before coming to the website and so they give less attention to other aspects such as the website design(Mebrate,2010) hence the inclusion of this aspect in assessing the academic website.

2.11 Chapter Summary

In this chapter, the researcher has discussed relevant literature that is covered in the study. The most crucial areas discussed are service delivery, service quality and the attributes of a good website. Literature reviewed indicated that quality of website applications has often been assessed in ad-hoc ways, primarily basing them on common sense, intuition and expertise of the developers. Some of the websites evaluation techniques that do exist have been used to focus on some quality characteristics such as usability and accessibility providing partial solutions because they focus on functional or nonfunctional requirements. Higher learning institutional

websites need flexible and integral solutions; hence it requires enhanced assessment tools and techniques.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

In this chapter, the methodology used is presented. The research design adopted, the target population, description of the sample and sampling techniques, instruments, data collection instruments and data analysis procedures are discussed. At the end of this chapter, the development of the software tool is then discussed.

3.1 Study Design

According to Burns and Groove, (2005), quantitative research is conducted to describe, examine and determine relationships among the variables. This study adopted the descriptive design which is the most suitable design because it is more accurate in getting information on different aspects on the website quality from users. This design was used in gathering quantitative responses from the respondents in order to ascertain the extent to which they are satisfied with the following quality aspects of the UEAB website: usability, functionality, reliability, efficiency, security, content and availability of the university website. Further, the adopted model was used in developing a prototype of the assessment tool (WAT) that would be used in assessing the website using the iterative design.

3.2 Population and Sampling

This section presents the research target population and the sampling techniques that were employed in the study.

3.2.1 Target Population

The study targeted all the University of Eastern Africa, Baraton students, faculty and staff who are the frequent users of the institution website. The total population of the study was approximated to be about 2218website users. The population was categorized into three clusters that are staff, lectures and students. The distribution of this population comprised of 1980 students, 121 support staff and 120 lectures.

3.2.2 Sample and Sampling Techniques

The UEAB targeted population constituted of 2218UEAB website users. Systematic sampling and random sampling techniques were used to pick a sample from each category and for the purpose of ensuring representativeness of the students, staff and faculty. The student sample was arrived at by the use of a systematic sampling method for the researcher to have equal representation of respondents from all the academic levels of study. The simple random sampling technique was applied to arrive at an even representation of the faculty and staff. For this study, a sample size of 401 was involved in the study, which was distributed in percentage depending on the number of members in each group. The desired level of accuracy was set to a confidence level of 95% and an absolute precision (relative margin of error) of 5%.In determining the sample size, the researcher adopted the Slovin's formula as shown below.

$$n = \frac{N}{1 + Ne^2},$$

Where : n = sample size to be studied

N = Total population

E = Margin of error (0.05)

From each category the following number of respondents was selected for the study as shown in table below:

Table 3.1: Shows the Population and Sample Size

Category	Population	Sample
Students	1980	240(53%)
Faculty	120	81(25%)
Staff(-3 IT staff)	118	80(21%)
Total	**2218**	**401**

3.3 Data Collection Instruments`

The researcher designed a questionnaire to gather the data for the study. The questionnaires were designed to help determine the quality of the UEAB website. The questionnaire had open and closed ended items. A Likert scale was used as it gives an overview of how different users view the website given the parameters that the researcher used. The questionnaire contained 35 items divided into sections. The first section contained the demographic data and general website usage. This second section was divided into six sub-sections consisting of: Usability, Functionality, Reliability, Security, Efficiency, Availability and Content quality with five items on each section. The questionnaire allowed the measuring of a set of requirements that contribute to the quality of a website given a set of predefined parameters.

The questionnaires were used because they collect a lot of information over a very short period of time, are cost effective and the data collected are easy to analyze. The data can also be quantified for analysis by a computer software package. The use of questionnaires also reduces the possibility of bias since they have uniform questions

and that the researchers' own opinion does not influence the respondents to answer questions in a certain manner. This tool was suitable for the large literate population and the information needed was easily described in writing.

3.4 Quality Control

3.4.1 Validity of the Instrument

Validity is an indication of how sound the research is. It applies to both the design and the methods of the research. Validity in data collection means that the findings truly represent the phenomenon measured. It is the degree to which a test measurers what it is supposed to measure. The questionnaire designed to tap information from the respondents were content validated by the supervisors from Moi University. Suitability of items and appropriateness of the language was also determined. The corrections and recommendations of the experts were used to perfect the research instrument.

3.4.2 Reliability

Reliability is the extent to which an instrument produces the same result (consistent) every time it is used. The researcher conducted a pilot study two weeks prior to the actual administration of the questionnaires. The pilot study was intended to identify an unforeseen item during the initial development of the instruments and also to determine field experiences. A sample size of 22 (10 %) of the actual study was involved and was randomly selected from the clusters. Cronbach's alpha was used to check for internal consistency of item scores in the questionnaire. The Cronbach's alpha coefficient of the 35 items indicated .843. This meant that there was a good consistency between the questions. However, rewording changes were made on

questions 2(B) for clarity and there was the addition of question 14. These subsequent changes were made to the questionnaire before it was sent out for data collection.

3.5 Data Collection Procedure

The researcher obtained an introduction letter from Moi University allowing her to proceed with data collection. After seeking clearance from the Research Committee at the University of Eastern Africa, Baraton, the researcher with the help of a research assistant reached out to the target population and distributed the instrument to the respondents. The questionnaire were distributed to 401 respondents within the university and given two days to respond to the instrument. After two days the team moved back to the stations to collect the instruments in readiness for analysis. Of all the 401 questionnaires distributed, 394 were collected back and used for analysis.

3.6 Statistical Treatment of Data

Descriptive and inferential statistics were used to analyze the collected data. Statistical Packages for Social Science (SPSS) with the assistance of a statistician was used in data analysis. The descriptive statistics were employed to establish tables, frequencies, percentages, means and standard deviations in order to analyze data and determine the level of users satisfaction. For research question one both descriptive and inferential statistics (ANOVA) were used while the demographic data and the other questions were discussed using descriptive statistics. A One-Way ANOVA was used to test for differences in assessment among the study groups. It was used to determine whether or not there is a significant difference in the means of groups overall. Cohen, et al.(2009) affirms this by stating that ANOVA is used to compare the means of two or more samples, and that it determines whether the means are statistically significantly different.

Descriptive statistics enables the researcher to summarize and organize the data in an effective and meaningful manner. It provided tools for describing collections of statistical observations and reducing information to an understandable form. This included:

a) Arithmetic mean: this describes the central tendency for a group. It is used in tests of mean differences between groups.
b) Percentages: which were used to show the differences of a part to the whole.
c) Standard deviation: this is a measure of the spread of responses and the range of answers. A small standard deviation shows considerable agreement; a large standard deviation shows less agreement.

Inferential statistics allow the researcher to make decision or inferences by interpreting data patterns. Researchers use inferential statistics to determine whether an expected pattern or designated theories are actually found in the observations.

3.7 System Development

The system development used the prototyping approach to develop a functional assessment tool WAT. This approach involves the incorporation of customer feedback in making changes and refining the system until there is a finished product. This was done based on the findings.

Prototyping comprises of the following steps:

1· Requirements Definition/Collection: Feedback information collected using the questionnaires was used to complete system requirements.
2· Design: The Data Flow Diagrams were used as modeling tools.

3· Prototype Creation/Modification: The website assessment software tool was constructed

4· Assessment: The prototype is presented to the customer for review to (students in the Information Systems and Computing department) gives comments and suggestions on the software tool.

5· Prototype Refinement: Information collected from the users is used to refine the prototype.

6. System implementation: System is installed.

3.7.1 Modeling Tools

Data flow diagrams were used as the modeling tools of the study. Data flow diagrams were used to reveal relations between the various components of the system and show how data flows.

3.7.2 Software Development Tools

The software development tools behind the software tool are PHP, CSS, HTML, JavaScript and MySQL..In this study, PHP has been used as a server scripting language. The software is a free and open source scripting language. The PHP code is executed on the server and the result is returned to the browser and displayed using HTML.HTML is used to format and display the output of the PHP scripts in a browser. PHP was preferred due to its flexibility in carrying out a number of tasks which include generating dynamic page content, creating, opening, deleting and closing files on the server, collect form data, modify data in your data, encrypt pages and many more. Cascading Style Sheets (CSS) has been used to improve the layout in terms of colour, styling and design of HTML which has been used to structure the

assessment tool. JavaScript has been used for field and result validation in the developed of the tool in the study. JavaScript is often used to perform operations that would otherwise encumber the server, like form input validation. MySQL has been used as the backend database.

3.8 Ethical Considerations

To ensure ethical conduct was observed in the study, clearance by the UEAB ethic committee was obtained. Confidentiality of the respondents which is the right to maintain autonomy and privacy was ensured. The participants involved in the research voluntarily offered themselves to participate in the study. A cover letter that explained the ethical clearance for the study was attached to the questionnaire.

The respondents were informed that the information they provided would be kept confidential and that the results of the study would only be used for the purposes of the study. They were assured that the results of the study would not jeopardize their status. The respondents were provided with all the relevant information pertaining to the study for them to make an informed decision to participate. To ensure privacy of the respondents, the respondents were required to remain anonymous.

3.9 Chapter Summary

In this chapter, the researcher has discussed the methodology in detail. The researcher described the population and sampling techniques that were used to arrive at the sample size. Data collection instruments, validity and reliability of the instrument were also presented. Also discussed are data collection and analysis procedures, WAT development as well as ethical considerations which conclude this chapter.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter presents a discussion on the presentation, statistics analysis, and interpretation of data collected from the questionnaires. The findings are presented, analyzed, and interpreted. Inferences and meanings were drawn from the findings of the data analysis and compared with the presented literature. The discussions of the findings are presented in tabular form to facilitate reading and understanding.

4.1 Description of the Respondents'

This section gives a brief presentation of the demographic data of the respondents that were involved in the study.

Table 4.1: Descriptive Statistics on Status of the Respondents

	Status of respondent	
Status	**Frequency**	**Percent**
Student	239	60.5
Faculty	80	20.5
Staff	75	19.0
Total	394	100.0

Table 4.1 indicates that 239(60.5%) of the respondents comprised of students, 80(20.5%) the faculty (teaching staff) and 75(19%) the staff (non- teaching staff). The total number of respondents that participated in the study was 394.

Table 4.2: Descriptive Statistics on Students' Year of Study

Year of study		
Year of study	**Frequency**	**Percent**
Freshman(1st Year)	48	12.7
Sophomore(2nd Year)	74	19.2
Junior(3rd Year)	63	16.2
Senior(4th Year)	54	13.7
Total	239	60.5

According to table 4.2 the respondents included 1st year students which comprised of 48(12.7%), 2nd year students 74(19.2%), 3rd year students 63(16.2%) and 4th year students 54(13.7%). This includes students from all the faculties.

Table4.3: Descriptive Statistics on the Building where Faculty or Staff are Stationed

Building where faculty and staff are stationed

Work station	Frequency	Percent
Administration building	28	6.9
Humanities building	41	10.4
Science Building	25	6.3
Technology building	2	.5
Library building	21	5.3
Hostels	2	.5
Other	36	9.1
Total	155	39.5

According to the data presented in Table 4.3., it is evident that the majority (10.4%) of the respondents came from the humanities building where the schools of Business and Humanities and Social Sciences are located that comprised of 41 respondents. It

was followed by respondents from other buildings on campus which comprised of 9.1 %. The administration building had 6.9% respondents that participated in the study. The Hostels 0.5% and the Technology buildings, 0.5% which had the lowest number of respondents which have relatively fewer employees compared to the rest of the buildings.

Table 4.4: Descriptive Statistics to Compares the Number of visits Made by Faculty and Staff to the UEAB Website

		How often do you visit the UEAB website				
		Twice a day	Daily	Twice a week	Once a Trimester	Total
Building where faculty and staff are stationed	Administration building	0	20	4	1	25
	Humanities building	4	25	3	9	41
	Science Building	2	14	2	7	25
	Technology building	0	0	1	1	2
	Library building	2	12	7	1	22
	Hostels	0	2	0	0	2
	Other	0	31	3	1	35
Total		8	104	20	20	152

From the data represented on Table 4.4 the majority of respondents from the various buildings visit the website on a daily basis accounting to a total of 27% respondents. The number of respondents that visit the website twice a day accounted for 2% of the respondents, the number of respondents that visit the website twice a week and once a trimester accounted for 5% of the respondents respectively

Table 4.5: Descriptive Statistics to Compare the Status of the Respondents to the Number of Visits they Make on the Website

		How often do you visit the UEAB website				
		Twice a day	Daily	Twice a week	Once a Trimester	Total
Status of respondent	Student	11	68	98	62	239
	Faculty	5	44	9	22	80
	Staff	3	60	11	1	75
Total		19	172	118	86	394

From the analysis on Table 4.5, the number of respondents from the three categories differed on the number of visits that they make to the website. A large number of the students comprising of 24% students indicated that they visit the website twice a week, while 11% of the faculty and 15% of the staff indicated that they do visit the website on a daily basis. On the other hand, visits made twice a day were as follows: 3% students, faculty 1% and0.8% from the staff category. Only (1)0.3% respondent from the staff category indicated that he/she visits the website once a trimester. These results allude to the fact that the faculty and staff are daily users of the website, which means that the website plays an important role in their daily activities.

The researcher used an interpretation scale to analyse and interpret the results of the research.

Range	Likert-scale	Interpretation Scale
1.00-1.49	Strongly disagree	Disagree
1.50-2.49	Disagree	
2.50 – 3.45	Neutral	Neither Agree nor Disagree
3.50 – 4. 49	Agree	Agree
4.50 – 5.00	Strongly agree	

4.2 Analysis and Interpretation of Research Questions

Research question 1: *What is the level of satisfaction of the users by the services offered by the UEAB website based on the research parameters?*

Table 4.6: Descriptive Statistics on Respondent's Assessment on the Website Usability

Items on Usability	N	Mean	Std. Deviation
It is easy to find my way to information from the homepage	394	3.8883	.97954
I am able to accurately predict which section of the website contains the information that am looking for	394	3.6777	1.01898
The homepage content makes me want to explore the site further	394	3.4213	1.19590
The website is well suited to first time visitors	394	3.2360	1.16681
The site has characteristics that make it appealing	394	3.5330	1.06299

From the descriptive statistics on respondents' assessment on usability, most of the respondents agreed with the fact that it is easy for them to find their way to information from the home page on the website with a mean of 3.8883.

The item *'the website is well suited to first time visitors'* had the lowest mean of 3.2360 implying that respondents neither disagree nor agreed with this item.

The item '*I am able to accurately predict which section of the website contains the information that am looking for'* had a mean of 3.6777 which implies that most of the respondents are able to predict where to get the information that they are looking for.

The item '*the homepage content makes me want to explore the site further'* had a mean of 3.4313. This implies that the homepage content needs to be improved so as to make the users always want to explore more from the site or come back or explore more on the website.

Table 4.7: Descriptive Statistics on the Users' Assessment on the Functionality of the Website

Items on Functionality	N	Mean	Std. Deviation
The website contains administration tools which enhance efficiency i.e. Help, FAQ	394	3.3655	1.09518
All functionality are clearly labelled	394	3.8807	2.33100
It is easy to navigate the website i.e. options to return to home page, top of pages is provided	394	4.0178	1.39690
There are linkages to other sites that have discussions on similar topics	394	3.5685	2.33605
The selected graphics serve a functional purpose	394	3.5000	1.02946

For the functionality of the website, the respondents agreed on the item *'it is easy to navigate the website i.e. options to return to home page, top of pages is provided',* that scored the highest mean of 4.0178. This means that it is easy for the users to go about or navigate through the web pages.

The item '*all functionalities are clearly labelled'* indicated a mean of 3.8807. These results indicate that the respondents agree to the clear labelling of the website functionalities such that if one wants to access the online registration system, they know which label or link to click on.

Most of the respondents agreed on the item *'the selected graphics serve a functional purpose'* which scored a mean of 3.5000 in this category. This means that most of the respondents were not for the opinion that the graphics on the website are of a functional purpose on the website while others agreed.According to Babak et al., (2012), the users of a website are interested in the quality of the website which is clusive of the graphics used.The graphics on the website bring the world into your document in a concise and unforgettable way that saves that proverbial "thousand words" of explanation. Why describe something when you can simply and more memorably show it? The website graphics must be simple so that it does not interfere with the arrangement of the information presented. Patrick and Sarah, (2011)indicate that graphics used on a website must not hinder web navigation, nor increase the time necessary for opening the website. The navigation must be intuitive and ergonomic. Fine graphics are accorded with all the other aspects of accessibility and applicability of the website.

The item *'the website contains administration tools which enhance efficiency i.e. Help, FAQ'* indicated the least mean of 3.3655 in this category. This means that the respondents were neutral on this item. The Help and FAQ features are an important aspect of the website.FAQ pages aim to make finding answers easy for users. The ideal FAQ pages help users of the website without the need for outside assistance. More often than not, unfortunately, this ideal is not realized.This makes the website more user friendly than having to wait for responses from the helpdesk.Negi,(2009) clearly points out that overall service quality is significantly associated with and contributes to the overall satisfaction of service consumers. These features enhance service provision, and if the consumers of the service are not satisfied with the

available services, it has negative significances towards the overall consumer's satisfaction of the services.

Table 4.8: Descriptive Statistics on Respondent's Assessment on the Efficiency of the UEAB Website

Items on Efficiency	N	Mean	Std. Deviation
I find it easy to use the website	394	3.9188	1.11136
The information posted on the website is always timely	394	3.2970	1.13498
I'm satisfied by the web content	394	3.4543	2.32460
The web services and functionalities are perfect	394	3.2360	1.04729
The website offers dialogue areas or feedback features for visitors	394	3.3122	1.12637

The item '*I find it easy to use the website*' scored a mean of 3.9188 which was the highest scoring item in this category. This would means that the respondents agreed to the fact that it is easy for them to navigate through the website.

The items *'the information posted on the website is always timely'* had a mean of 3.2970 and '*the web services and functionalities are perfect'* which scored 3.2360 respectively. This reveals that the respondents were neutral with these items, which means that the users of the website are not satisfied by the timeliness of the posts on the website and that most of the information has been on the website longer than it should as echoed by the need for content update given on Question 13. This also reveals that the website users are not satisfied with some of the functionalities of the website.

The item '*the website offers dialogue area or feedback features for visitors'* scored a mean of 3.3122. These results indicate that the respondents were neutral on this item. Whereas feedback from the user helps the service provides to improve on their weaknesses.

Gourand Theingi, (2009) argue that the service provider improves on the services provided so as to satisfy the needs of the consumer. Literature search also indicates that any organization will gain a lasting competitive advantage if it pays attention to the satisfaction of the needs of the consumers. Customer feedback is the transmission of negative information (complaints) or positive information (compliments) to providers about the services used. Such information can be useful for providers in identifying areas in which adjustments of performance are required. According to Ahmet and Aykut, (2012) affirms that continuous feedback from the users presents valuable input to universities to improve their web sites. In order to satisfy the constantly changing demands of the website users and improve the features of the website, university administrators may deploy a site intercept survey on their website and collect survey data. Gour and Theingi, (2009) conclude that dissatisfied customers are significantly more likely to provide negative feedback than are satisfied customers to provide positive feedback. It is presumed that customers who provide negative feedback are seeking to achieve some form of compensation for unmet quality of services; in contrast, the provision of positive feedback is often perceived by customers as not being rewarded.

Table 4.9: Descriptive Statistics on Respondents' Assessment on the Reliability of the UEAB Website

Items on Reliability	N	Mean	Std. Deviation
The website is accessible all the time	394	3.3249	2.36407
The information on the website is always consistent	394	3.5431	.98302
The forms on the website are working	394	3.4924	1.01450
The website contains some broken links	394	3.0330	1.05398
Information on the website is regularly updated	394	3.1142	1.10038

The item '*the information on the website is always consistent'* scored the highest mean of 3.5431, which indicate that most of the respondents agreed with this item. The item *'the website contains some broken links'* had the lowest mean of 3.0330 in this category, which reveals that the respondents were neutral to the fact that there are broken links on the website.

These results concur with Pressman, (2010), who indicates that the website software should be designed in such a way that they do not allow any intentional failure, wrong information and transaction errors meaning that the website should offer reliable services to the users. The website must be reliable in the information that it provides to the public.The information posted on the website should always be consistent and it should not contain any broken links that frustrate the users.

The item '*information on the website is regularly updated'* scored a mean of 3.1142. These results indicate that the respondents were neutral on this item which would mean that the information on the website is not regularly updated or posted at the right time. The information that is up to date is more reliable to the users than outdated information.

Table 4.10: Descriptive Statistics on Respondent's Assessment on the Availability of the UEAB Website

Items on Availability	N	Mean	Std. Deviation
The website is available 24/7	394	3.4594	2.45045
I always get the information and services that I need from the website	394	3.4188	1.14796
There is communication when the website is down	394	2.4264	1.26246
The website takes a very short time to load	394	3.4162	1.20192
The network infrastructure in the institution is very good and so I can access the website from anywhere on campus.	394	3.2411	2.45680

The analysis in this category indicated that a large number of the respondents were neutral on most of the items in this category. The item *'the website is available 24/7'* scored the highest mean of 3.4594, which means that most of the respondents were neutral on this item. A typical end user of any website will expect the website to be available anytime everyday with minimal planned or unplanned disruptions due to maintenance, upgrades, or failures.

The item '*the network infrastructure in the institution is very good and so I can access the website from anywhere on campuses*' scored a mean of 3.2411. This means that the network infrastructure needs to be improved so that the website users are able to access it from anywhere on campus. Every element of the network infrastructure must support the availability of the website since availability is best understood from the perspective of those who visit and use the website.

The item '*there is communication whenever the website is down'* scored the lowest mean in this category. It scored a mean of 2.4264, which means that the respondents

disagreed with this item. That is, there is no communication when the website is down to the users. Gour and Theingi, (2009) argue that communication is very important between service providers and the consumers of that service.Website downtime are sometimes unavoidable. The key to managing the downtime properly is in maintaining communication with the website users. An outage that lasts for days is not acceptable unless there's a very good reason for the downtime. The reason, however, must be properly communicated to the website users.

Effective communication helps build trust in the services that are being offered and the users are able to share their knowledge and experiences with the service providers. It is also important to informing the website users of any major website changes which is the best practice. When the website undergoes changes that may affect the user's ability to locate information, such as a website redesign, help the users locate information in the new format by explaining the changes because websites address a global audience, in a strongly competitive, "open" environment (Chinga and Lukong, 2010).

Table 4.11: Descriptive Statistics on Respondent's Assessment on the Security of the UEAB Website

Items on Security	N	Mean	Std. Deviation
I'm aware of the security policies regarding information protection in the institution	394	3.2437	1.14875
I believe that the website is well protected	394	3.4239	.95205
The website is protected from malicious attacks	394	3.5330	2.27055
The website protects unauthorized modification to information.	394	3.4467	.94557
The website is secure so as to avoid loss of information	394	3.3807	.97147

The analysis in this category reveals that the respondents are neutral with most of the items in this category. The item '*the website is protected from malicious attacks'* scored the highest mean of 3.5330. This reveals that the respondents are aware of the website protection against malicious attack.

The item '*I'm aware of the security policies regarding information protection in the institution*' had a mean of 3.2437. This item scored the least mean which indicate that most of the website users are not aware of the security policies regarding the protection of information on the website. These results are affirmed by what Waters, (2009) arguments, that higher leaning institutions must have clear policies that are related to information protection and that the users of the information should be aware of these policies. This should be implemented in all educational institutions but lack of training on these policies is the major problem which may also lead to other risks such as data theft or other security holes within the system.

The items '*I believe that the website is well protected'* had a mean of 3.4239, '*The website protects unauthorized modification of information'* had a mean of 3.4467, and '*The website is secure so as to avoid loss of information'* had a mean of 3.3807respectively.According to Myungee, (2009) a website often collects and stores a variety of sensitive, personal information about its customers in order to better serve them in their future visitation thus web services should be delivered and operated in a reliable and dependable manner to build trust and confidence from customers.

"Security training is at the heart of writing good code", writes John Heimann of Oracle (Heimann, 2006). For organizations that make available internet connected systems to

the public for use, security training is a must have and is often overlooked in many developers backgrounds. Many at times within academia and within the corporate world the focus in educating developers is on creating efficient bug free code. Security checks are optional at best and are rarely considered an ignored.

The descriptive statistics and ANOVA analysis presented in *Appendix 3*gives the comparison between the three categories of the respondents in response to items indicated on each research parameters. The descriptive statistics on Usability are indicated on Table 4.12: students (mean, 3.5766 and standard deviation of .91951), staff (mean, 3.2000 and standard deviation of .53927) and faculty (mean 3.8000 and standard deviation .63325). This mean indicates that the faculty had the highest mean than the rest. An ANOVA was employed to determine the users assessment based on the respondents status. In the assessment of items on usability and Item 1 yielded a *p*-value of .001 which is less than the significance level of .05 indicating that the respondents were of similar views on this construct. This could be attributed to the fact that the faculty use the website more frequently not only in search of news or information but also they use it as a gateway to the library management system where they could be searching for teaching resources or carrying out research studies. Item 2 yielded a *p*-value of .219 and Item5 yielded a *p*-value of .063 which is greater than the level of significant of .05. This means that the respondents have different views on the assessment of these items.

Table 4.12: Group Descriptive Statistics on Usability

Status of respondent		It is easy to find my way to information from the homepage	I am able to accurately predict which section of the website contains the information that am looking for	The homepage content makes me want to explore the site further	The website is well suited to first time visitors	The site has characteristics that make it appealing	Mean of usability variables
Student	Mean	3.9540	3.6067	3.4979	3.5439	3.5439	3.5766
	N	239	239	239	239	239	239
	Std. Deviation	1.06608	1.16502	1.23627	1.25237	1.25237	.91951
Faculty	Mean	4.0494	3.8025	3.7407	3.7037	3.7037	3.8000
	N	80	80	80	80	80	80
	Std. Deviation	.87894	.90027	1.00968	.62138	.62138	.63325
Staff	Mean	3.5067	3.7733	2.8400	3.3067	3.3067	3.2000
	N	75	75	75	75	75	75
	Std. Deviation	.64459	.48136	1.05318	.67730	.67730	.53927
Total	Mean	3.8886	3.6785	3.4228	3.5316	3.5316	3.5509
	N	394	394	394	394	394	394
	Std. Deviation	.97832	1.01782	1.19474	1.06198	1.06198	.82666

The descriptive statistics on functionality indicated by Table 4.13were as follows: students (mean, 3.5013 and standard deviation of .94467), faculty (mean 3.8988 and standard deviation of 1.44192) and the staff (mean 3.9147 and standard deviation of .57626). The staff had the highest mean on this parameter which could be attributed to the accessibility of the website from their work station unlike the students who at the time of the study were not able to have the wireless connection. An ANOVA (Appendix 3) was employed to determine the user's assessment on the functionality of the website. Item 1 yielded a *p*-value of .004, item 2 - .001, item 3 - .018 and item 4 - .007 which is less than the significance level of .05. This indicates that the respondents were of similar views. Item 5 yielded a *p*-value of .561 which indicates that the respondents had different views based on this item. This would be attributed

to the fact that all website users would want to see graphics that serve the functional purpose and as such they should be changed over time.

Table 4.13: Group Descriptive Statistic on Functionality

Status of respondent		The website contains administration tools which enhance efficiency i.e. Help, FAQ	All functionality if clearly labeled	It is easy to navigate the website i.e. options to return to home page, top of pages is provided	There are linkages to other sites that have discussions on similar topics	The selected graphics serve a functional purpose	Mean of functionality variables
Student	Mean	3.3556	3.5146	3.9163	3.2678	3.4519	3.5013
	N	239	239	239	239	239	239
	Std. Deviation	1.20707	1.23278	1.65047	1.17549	1.17609	.94467
Faculty	Mean	3.6543	4.4444	3.9259	3.9753	3.4938	3.8988
	N	80	80	80	80	80	80
	Std. Deviation	1.00200	4.53872	.81820	4.56337	.79252	1.44192
Staff	Mean	3.0667	4.4133	4.4267	4.0667	3.6000	3.9147
	N	75	75	75	75	75	75
	Std. Deviation	.68445	.83978	.82484	1.16634	.78843	.57626
Total	Mean	3.3620	3.8759	4.0152	3.5646	3.4886	3.6613
	N	394	394	394	394	394	394
	Std. Deviation	1.09826	2.33105	1.39607	2.33550	1.04067	1.03099

The descriptive statistics on Efficiency indicated by Table 4.14 were as follows: students (mean, 3.2887 and standard deviation of .96693), faculty (mean 3.4716 and standard deviation of .68433) and staff (mean 3.8907 and standard deviation of 1.12095). The staff had the highest mean on this parameter which could be attributed to the building where the staffs are stationed. The faculty and the students on the other hand recorded low means which could be attributed to the fact that they visit the

website in search for new information. This means that the website users in the two categories are not satisfied with most of the items in this category. An ANOVA was employed to determine the user's assessment of efficiency of the website. Item 1 yielded a *p*-value of .000, item 2 - .024, item 3 - .001, item 4 - .000 and item 5 .010. These results indicate that the website users were of similar views on items in this category.

Table 4.14: Group Descriptive Statistics on Efficiency

Status of respondent		I find it easy to use the website	The information posted on the website is always timely	I'm satisfied by the web content	The web services and functionalities are perfect	The website offers dialogue areas or feedback features for visitors	Mean of efficiency variables
Student	Mean	3.7615	3.2050	3.1883	3.0962	3.1925	3.2887
	N	239	239	239	239	239	239
	Std. Deviation	1.20818	1.24170	1.23759	1.15006	1.17956	.96693
Faculty	Mean	3.8272	3.2716	3.4074	3.2222	3.6296	3.4716
	N	80	80	80	80	80	80
	Std. Deviation	.83352	.97484	.83333	.85147	.95452	.68433
Staff	Mean	4.5067	3.6133	4.3200	3.6800	3.3333	3.8907
	N	75	75	75	75	75	75
	Std. Deviation	.86013	.88369	4.70526	.75624	1.08221	1.12095
Total	Mean	3.9165	3.2962	3.4481	3.2329	3.3089	3.4405
	N	394	394	394	394	394	394
	Std. Deviation	1.11547	1.13811	2.32602	1.05023	1.12912	.97397

Descriptive statistics on Reliability (Table 4.15) were as follows: students (mean, 3.2669 and standard deviation of .73738), faculty (mean, 3.5654 and standard deviation of 1.10127) and staff (mean 3.1333 and standard deviation of .57171). The

faculty indicated the highest mean which could be attributed to them being comfortable with the accessibility of the website, the content presented in terms of consistency and the availability of working forms on the website. This could be enhanced by the fact that they are able to access the website from their work stations. The staff scored the lowest mean which could be attributed to the fact that they rarely use the internet for other purposes rather than for checking the emails.

Table 4.15: Group Descriptive Statistics on Reliability

Status of respondent		The website is accessible all the time	The information on the website is always consistent	The forms on the website are working	The website contains some broken links	Information on the website is regularly updated	Mean of reliability variables
Student	Mean	3.1464	3.5188	3.4895	3.0669	3.1130	3.2669
	N	239	239	239	239	239	239
	Std. Deviation	1.26669	1.09940	1.11469	1.09031	1.19162	.73738
Faculty	Mean	4.0247	3.7160	3.5926	3.1235	3.3704	3.5654
	N	80	80	80	80	80	80
	Std. Deviation	4.60156	.80985	.80277	1.02935	.96753	1.10127
Staff	Mean	3.1467	3.4400	3.4000	2.8400	2.8400	3.1333
	N	75	75	75	75	75	75
	Std. Deviation	.98218	.70212	.86992	.94497	.87054	.57171
Total	Mean	3.3266	3.5443	3.4937	3.0354	3.1139	3.3028
	N	394	394	394	394	394	394
	Std. Deviation	2.36132	.98204	1.01353	1.05376	1.10361	.81026

An ANOVA was employed to determine the user's assessment on the reliability of the website. Item 1 yielded a *p*-value of .011 and item 5 - .011. This indicates that there is no difference in the users' assessment on these items. Item 2 yielded a *p*-value of .175, item 3 - .494 and item 4 - .187. These three items indicate that users were of different views in the assessment of these items. These would be attributed to the knowledge of use of the website and the services that are offered. Most of the users' seem not to be aware of other services that the website offers than others.

From the analysis on Table 4.16 on availability the means of the three groups were as follows: students (mean, 3.0987 and standard deviation of 1.11549), faculty (mean 3.3309 and standard deviation of 1.29428) staff (mean, 3.3307 and standard deviation of .66128). These results indicate that the respondents from the three categories neither agreed nor disagreed with the items on availability. An ANOVA was employed to determine the user's assessment on the availability of the website. Item 1 yielded a *p*-value of .001, Item 2, .034 item 3, .000, item 4, .000 and item 5 .070. These results indicate that users were of similar opinions in the user's assessment on items 1, 2,3 and 4. But the users seem to differ in their assessment on item 5 which is attributed by the fact that most of the staff are stationed in the administration building where they are connected to the internet via direct cables while the students and the faculty access the internet from different points through wireless points which are at times inaccessible due to interferences in the network connection.

Table 4.16: Group Descriptive Statistics on Availability

Status of respondent		The website is available 24/7	I always get the information and services that I need from the website	There is communication when the website is down	The website takes a very short time to load	The network infrastructure in the institution is very good and so I can access the website from anywhere on campus.	Mean of availability variables
Student	Mean	3.0921	3.4477	2.5523	3.2678	3.1339	3.0987
	N	239	239	239	239	239	239
	Std. Deviation	1.35655	1.26540	1.26872	1.22107	2.93609	1.11549
Faculty	Mean	4.0988	3.5802	2.5802	3.3951	3.0000	3.3309
	N	80	80	80	80	80	80
	Std. Deviation	4.63574	1.08241	1.18178	1.15844	1.30384	1.29428
Staff	Mean	3.9467	3.1200	1.8533	3.9200	3.8133	3.3307
	N	75	75	75	75	75	75
	Std. Deviation	1.27230	.75265	1.17051	1.04958	1.45837	.66128
Total	Mean	3.4608	3.4127	2.4253	3.4177	3.2354	3.1904
	N	394	394	394	394	394	394
	Std. Deviation	2.44749	1.15514	1.26104	1.20076	2.45627	1.08941

Descriptive statistics on Security (Table 4.17) were as follows: students (mean, 3.3824 and standard deviation of .95804), faculty (mean, 3.5827 and standard deviation of 1.16499) and staff (mean 3.2907 and standard deviation of .52432). The faculty scored the highest mean in this category which could be attributed to them having some little knowledge on security issues but generally the items on this category scored lower means compared to the other categories. An ANOVA was employed to determine the user's assessment on the security of the website. Item 1 yielded a *p*-value of .556, item 2 - .098, item 4 - .200 and item 5- .646. These results indicate that there is a difference in the users' assessment on these items. Even though

the results of items in this category were neutral, the ANOVA results indicate that users of the website assessed these items differently as indicated by the significance difference given the results. Item 3 yielded a *p*-value of .027 which indicates that there was no difference in the users' assessment on this item. Hence, the reason as to why the website users from the three categories indicated that they were aware that the website is protected from malicious attacks.

Table 4.17: Group Descriptive Statistics on Security

Status of respondent		I'm aware of the security policies regarding information protection in the institution	I believe that the website is well protected	The website is protected from malicious attacks	The website protects unauthorized modification to information.	The website is secure so as to avoid loss of information	Mean of security variables
Student	Mean	3.2845	3.4686	3.3891	3.4268	3.3431	3.3824
	N	239	239	239	239	239	239
	Std. Deviation	1.18933	1.05622	1.09777	1.06997	1.09596	.95804
Faculty	Mean	3.2346	3.4938	4.1358	3.6049	3.4444	3.5827
	N	80	80	80	80	80	80
	Std. Deviation	1.22751	.79252	4.57098	.75298	.79057	1.16499
Staff	Mean	3.1200	3.2133	3.3467	3.3467	3.4267	3.2907
	N	75	75	75	75	75	75
	Std. Deviation	.89985	.70315	.64710	.64710	.68128	.52432
Total	Mean	3.2430	3.4253	3.5342	3.4481	3.3797	3.4061
	N	394	394	394	394	394	394
	Std. Deviation	1.14735	.95128	2.26779	.94478	.97042	.94389

Research question 2: *What are the users' assessments and opinions on the current website quality?*

Table 4.18: Descriptive Statistics on the User's Opinions on the Current Website Quality

Items on the Quality of the Current Website	N	Mean	Std. Deviation
The content on the website is regularly updated	394	3.3528	1.12112
The information posted on the website is valid and accurate	394	3.5990	1.00715
The information presented is easy to understand	394	3.7107	1.08777
The content on the website is varied and changing (dynamic)	394	3.3477	1.04036
The website shows that the institution considers service quality.	394	3.6472	1.07949

The analysis in this category indicated the following results on service quality of the UEAB website. The item '*the information presented is easy to understand'* had the highest mean of 3.7107 with a standard deviation of 1.08777. The results from this item indicate that the respondents agree to the easy of understanding the information posted on the website.

The item '*the content on the website is varied and changing (dynamic)*' had a mean of 3.3477 with a standard deviation of 1.04036, which means that the updates on the website are not regularly done. This scored closely to the item '*the content on the website is regularly updated*' which had a mean of 3.3528 with a standard deviation of 1.12112. These results conceded with the opinions that most of the respondents outline on Question 13, where they indicated that the website should be regularly

updated. Fresh and unique website content is a very important factor in encouraging people to revisit your site more often. Content is king.

Further, Roberto, (2012) argues that the website users are usually concerned with ease of use of the features, the aesthetic features and its specific user oriented content. Nwankwo, (2007) observes that poor service quality from an internal service department of an institution to internal customers can exert negative influence on the quality of service offered to the external customer such as students or alumni, in higher education settings.

The item '*the website shows that the institution considers service quality'* had a mean of 3.6472 with a standard deviation of 1.07949. This reveals that the institution is concerned with the website quality. Website quality is an essential strategy of the organizations' success of its presence on web. Olu, (2010) indicate that if the management pay attention to service quality, then the organization will gain a lasting competitive advantage.

Research question 3: *How do the users prioritize the attributes of a good website based on the research parameters?*

Table 4.19: Descriptive Statistics on Respondents Weights Assigned to the Research Parameters given the Range of 1-5 Where 5 is the Most Important and 1 the Least Important

Research Parameters	N	Mean	Std. Deviation
Usability	394	3.9670	1.01210
Functionality	394	3.8858	.88795
Reliability	394	3.7792	1.06026
Efficiency	394	3.8046	1.04352
Security	394	3.5685	1.17939
Availability	394	3.7690	1.19794

Descriptive statistics on the users' weights were as follows: Usability (mean, 3.9670 and standard deviation, 1.01210, Functionality (mean, 3.8858 and standard deviation, .88795), Reliability (mean, 3.7792 and standard deviation 1.06026), efficiency (mean, 3.8046 and standard deviation 1.04352), Security (mean, 3.5686 and standard deviation 1.17939) and Availability (mean 3.7690 and standard deviation 1.19794).

From the analysis from the Table 4.19, the users of the website are more concerned with the usability of the website. Ahmet and Aykut, (2012) emphasize that website usability is concerned with how easy and intuitive it is for individuals learn to use and interact with the website.It is a measure of the quality of a website as it is perceived by the users. Usability is greatly associated with a positive attitude toward the website (Nor and Tun, 2008).That is, the information of the websites' homepage should be easy to find for all the users whether first time visitors or those that have used it before. The users should be able to predict which section of the website contains the information that they are looking for very fast, the home page should be appealing so as to make the website users want to explore it further, and that the website should have characteristics that make it appealing e.g the links, graphics etc.

The results on the security of the website which had the lowest mean of 3.5685 would change if the website users' were aware of the security policies that the institution has in place. Training can be an eye opener to this very important aspect of the website which the users need to know.

Users' opinions of improvements that would be made on the website (Item 12 on the questionnaire)

Question 11 asked the respondents to list their opinions of the improvements they would want to see on the university website. In asking this question, the research

meant to give an opportunity to the respondents to air their views on the website. The respondents to this question were distributed as follows; staff 45(11%), faculty 65 (17%) and students 157(40%) respectively. The respondents had a lot to say on this question but the comments were grouped into six themes. This included availability, security, content update, network infrastructure, interactivity and ease of use. Most of the responses were very similar but they revolved around these themes. Below are some direct citations of responses of the respondents:

Table 4.20: User Opinions on Improvements to be made

THEME	**RESPONSES**
Availability	*-It should be available all over campus* *-The website should be easily accessible all the time from anywhere within campus* *--It should be available 24/7 because most of the things in Baraton are better done on the website* *-The website should be available to many users*
Security	*-Should improve its security*
Content update	*-Physical features should annually be updated to make it attractive* *-Should be reliable and not always containing same features* *--Current updates which should be timely* *-Should measure standards of other learning institutions* *-Pictures of various schools and departments and make it simple* *-Physical features should be annually at updated to make it attractive* *-The student handbook* *-Improvement in the updates, based on all activities in the school .News discussed in assemblies and even daily blogs.* *-Improvements in the updates, based on all activities in the schools.* *-News discussed in assemblies and even daily blogs* *--Update the staff and faculty profiles and each department message and photographs* *-More information about everything happening in the university* *-Change cover photo/Change the website cover often enough.*

	Not one photo at a cover for diversity for long *-Early update of financial statements* *-More features in academic calendar of events, updates on university operations* *-The university journal* *-more links* *-Students oriented adverts and information* *-Timely updates of new events* *-Update more often and include research findings by both faculty and students* *-Some of the images are terrible and old*
Reliability(Network Infrastructure)	*-To stabilize the server, improve connection* *-It is usually slow ,some improvements should be added for it to work faster* *-Improve the network infrastructure for easy access at everywhere* *-All building should be connected to the generator so that incase of power failure from KPLC supply is not affected*

The response to this questions were quantitatively tabulated as per each theme, and the results were as follows; 8% of the total respondents pointed out more concerns on the improvement on the security of the website, 28% of those who responded to this question indicated concerns with the updating of the content on the website, 13% of the respondents indicated concerns with the availability of the website and the network infrastructure on the campus which should be improved, 18% of the respondents had concerns with the timely posting of important information, 5% were concerned with the accessibility from outside the country, 9%were concern with the loading of the website, 14% of the respondents indicated concern with the interactivity of the website, 3% on the ease of use by first time visitors, 2% on changes of language preferences where some of the respondents indicated the same opinions.

Comment: from the data represented above, content update was a major concern that the respondents pointed out, followed by the ease of use of the website.

Research Question 4: Users' opinions on limitations of base model that they would wish used in assessing the website and services that should be offered on the website (Item 12 and 13 on the questionnaire)

Question 12 asked the respondents to list any parameter (attribute) that they think should be considered in evaluating the website. A total of 128 (32%) respondents outlined their opinions. The representations from each category of respondents; 75(19%) were students, 20(5%) staff and 33(8%) faculty. The responses given in this question were similar to answers given to Question 13. The recurring responses deduced from the respondents were as following:

- *The website needs improvement based on the given attributes*
- *Standby help*
- *Navigation of the website*
- *Interactivity which should involve the students*
- *Diversity: on other issues of the school apart from academics eg other functions like social*
- *Effectiveness*
- *Consistency of information valuation*
- *Ability to entertain its users*
- *The attributes applied are good enough.*
- *Timely Response to questions(feedback)*
- *The design of the website should be simple for novice to maneuver around*
- *Involve parents, sponsors and guardians in the evaluation*

The responses on this questions were quantitatively summarized as follow; 55(14%) of the student respondents indicated interactivity of the website with the users as one of the parameters that should be used to evaluate the website. Most of the students' respondents 51(13%) and faculty 24(6%) indicated that it was important for other

stakeholders to be involved in evaluating the website. 12(3%) of the staff respondents and 21(5%) respondents from the faculty indicated feedback or timely response to questions as an attribute that should be used in assessing the website. The majority of the respondents 111(28%) indicated that if improvements are made based on the parameters used in the study the website will be excellent.

Question 13 on the questionnaire asked 'Is there any attribute that you would wish used to assess the website and any services that you would wish to be offered on the website'? A total of 305(77%) respondents responded to this question. Some of the opinions indicated by the respondents have been echoed in the research Question 12. The response given by the respondents were grouped into three themes which included interactivity, student services and other services as indicated below:

Table 4.21: Services to be offered

THEME	**RESPONSES**
Interactivity	*-Instant messaging and blogging* *-SABU services* *-Discussion with other institutions* *-Integration with social networking* *-More interaction between lecturers and students* *-Chat services to minimize movements from one office to another. All information system should be integrated or linked to the website* *-FAQ and HELP* *-Set a forum page where any member of the Baraton community can sign up and air their views.* *-Student suggestions lot/section to help view different ideas of students concerning different issues pertaining the university* *-Social networking and the yearbook* *-Sign out should be done online* *-Open social page to help members of the website interact and get to know each other* *-A page to allow students to air their views and bring up grievances that can be studied by parents or administrators .Also involve the parents so they are always informed on what is happening at the university.* *-Access of services from a wide range of mobile phones* *-The website taking too long on maintenances with no updates on what is going on*

Student services	*-Avail emergency contact numbers eg in the dorm for students use* *-More seminars on website use* *-Links to other websites should be increased*
Other services	*-A page to allow students to air their views and bring up grievances that can be studies by parents or administrators.* *-To provide each department with a site to help students and visitors know more about the departments* *-Abstracts of faculty and student publications* *-Non-teaching staff should be offered course and rewarded with certificates online* *-Inquiries services* *-Accessibility of individual information eg payroll information* *-Payment services- such as paybill accounts* *--The website should offer research samples to help students get a rough idea* *-Activities that are done in the school so that new students might find it interesting then applying* *-More contents on the institutions information should be added so as to attract more students* *-Articles and news(Newsletters/ weekly or quarterly news)* *-Weekly bulletin giving news about the university including videos to entice prospective students applying to join* *--Adverts of university products*

The analysis of responses to this question were quantitatively summarized as follows; student respondents 118(24%) indicated that the automation of the students' services such as sign-out be available as a service on the website. The manual process is very cumbersome for the students and it will save on costs for the institution if this service is automated. Interaction and collaboration of users with the outside world is a service that should be provided for on the website. Students would wish to collaborate with students from other institutions and by so doing they will be learning a lot, the e-learning portal is available for this service but they don't know how to use it and at the same time few lecturers use it.

Further in enhancing interactivity of the website, 60 (18%) of respondents from the staff category and 65(21%) of the faculty respondents indicated that they would wish some financial based services within the institution automated and should be made

accessible from the website. Some of these services would save costs for the University for printing all statements and pay slips each end month. Most organizations are going paperless and the internet that is available on campus is being underutilized. This should be accessible from various smart phone platforms, accessible through social media being able to post and get immediate feedback, students/teachers blogging thus making the website more interactive. Communicating on how long the website will take on maintenance is also important for the users because at times it takes longer than expected. Communicating feedback to the website users in also important. Having FAQ and HELP services and the integration of social media such as Facebook and twitter on the website will increase its interactivity. These are basic support tools on any website that can highly influence user satisfaction. The use of multi-language support as a sub-quality factor of interactivity will ensure that the website reaches out to a large number of users from different nationalities. Language can be a barrier for access of the website if the user does not understand the language that is used. A user cannot interact with a language they do not understand and so multi-language support was grouped as an aspect of interactivity in designing the WAT.

In addition, 7(2%) respondents from the staff indicated a concern on training of non-teaching staff which could be done through e-learning after which they are awarded certificates. This is an idea that the administration needs to consider in developing its human resource. Time can be created for such courses to be offered to the non-teaching staff for the organizations' development and growth. The internet coverage can support this idea.

Concerns were raised on the website repository by the respondents. 35(8%) of the students respondents and 23(7%) of the faculty respondents raised concern on the importance of updating the website research repository. This could offer a lot of services to those who are interested in research work which would include the three categories of respondents. For students who are undertaking research courses it could work as a reference point.

4.3 Chapter Summary

It is evident from the results presented in this chapter that users of the website play a major role in the quality assessment of any system. The lack of a website evaluation tool has made it cumbersome for the ITS department to get user feedback on the website. Further the three categories of website users have indicated that they are not satisfied with some of the quality aspects of the services provided thus affecting their satisfaction. This is evident from the inferential analysis where the three categories of users indicated unsatisfactory results on some of the items. It is therefore important to embrace the use of new technology and as such ensure quality of services at the same time. Lack of an assessment tool has made it difficult knowing which aspects of the website need improvements from the users' point of view. If the users are satisfied with the quality attributes of the websites then, their needs are meet hence they are satisfied by the services delivered by the website. The quantitative results led to the development of the WAT and interactivity was considered as an additional factor.

CHAPTER FIVE
SOFTWARE MODELING AND IMPLEMENTATION

5.0 Introduction

This chapter discusses the software modeling, system design, system development, testing and validation of the assessment tool and its implementation in detail. The modules designed are presented and a preview of how they operate is given.

5.1 Software Modeling

In designing the assessment tool, a careful review of related works in higher institutional websites evaluation and review of website model was made to compare the base model with the key attributes of a good website. The quality attributes based on the *Offut* web application model were adopted for the study. The quality attributes included usability, reliability, efficiency, functionality, availability, security and content which was included but was not part of the base model. These are common attributes to other website models as discussed in the review. Interactivity was considered in designing the assessment tool as concluded from the research findings.

This study aimed at developing an automated website assessment tool that can be used to solicit for feedback from users and give results that could be used in improving the website quality in terms of user satisfaction. An automated assessment tool will allow for more website users to give their feedback at the same time and the assessment can be tracked over time. The tool developed in this study will help illustrate and be used to evaluate the users experience in the context in which the website exists. Further, the assessment tool was developed so as to identify measurable features and attributes that comprise a successful and quality website.

Using the results from the data analysis the quality of the existing website can easily be improved and identified using the automated software assessment tool.

The comprehensive assessment framework that was used in designing the automated assessment tool is shown in the table below:

Table 5.1: Attributes and Quality Elements

Attribute/Constructs	Quality Elements
Usability	-Understandability -Interface attractiveness -Learnability(understand) -Operability(ease of use)
Functionality	-Search & Retrieval - Browsing - Navigation -Suitability
Availability	-Access on campus -24/7 access
Reliability	-Downloading speed -Fault tolerance -Multi browser support
Security	-Policies -Modifications -Secure transactions
Efficiency	-Time behavior -Accessibility of resources
Interactivity	-Clear functions -Feedback/Communication (chat,email,forms) -FAQ/HELP -Multi-language support
Content	-Updates -Consistency -Completeness -Reliability/correctness

5.2 System Development

In developing the tool, a prototype was developed. Prototyping is an information-gathering technique. Prototypes are useful in seeking user reactions, suggestions, innovations, and revision plans. The Iterative system development approach was deployed in constructing the prototype. The approach made use of the user centered design where the user gives their feedback, suggestions and opinions so as to come up with the system. The Iterative design methodology involves a cyclic process of creating the prototype, testing, analyzing and refining the product.

5.2.1: System Analysis

In developing the website assessment tool, the following activities were considered: requirement analysis which was determined from the findings of the study. Questionnaires were used as the requirement gathering tools. The requirements were analyzed to give findings which were used as the basis for developing the software tool.

5.2.2: Feasibility Analysis

Technical Feasibility was carried out so as to determine the technologies to be used in proposed project. Some technology issues that were to be considered for this project were: performance, ease of learning, ease of deployment and ease of support. The economic feasibility analysis was also carried out to evaluate the effectiveness of WAT. More commonly known as cost/benefit analysis, the procedure is to determine the benefits and savings that are expected from WAT and compares them with costs. If benefits out-weigh costs, then the decision is made to design and implement the system. In this case there were no monetary costs involved in the development of the WAT, and are no extra monetary costs of operating and supporting the software tool

since the webmaster will be able to handle the work without the organization incurring extra costs. In turn the tool will add value to the organization by providing feedback which will be used in improving the services offered on the website. In determining the operational feasibility of WAT, it was evident that the organization should be able to maintain and support this software once it is implemented.

5.2.3: System Design

The purpose of the design phase was to develop a solution of the problem specified by the requirement document. The objective of this step was to convert the system requirements analysis into a physical model. The results of the requirement analysis on “what to do”, are used to determine "how to do". The modeling tool used in designing the software tool was the data flow diagram (Fig 5.2.).The data flow diagram was used to depict the logical model of the system, describes an integral module of the software, the relationship of each part, flow of information and data conversion.

The website users who include the staff, faculty, students and the system administrator are presented as users on the DFD diagrams. These users access the website for various services as indicated by Fig 5.1. The users use their e-mail addresses and passwords to gain access into these systems which are the e-learning portal, library system and the online registration systems through the website (Web-based Information Systems). On the other end the system administrator is in charge of updating information on the website, checking for errors, maintenance of the website and in addition to these analyze the results from the WAT and implement necessary changes.

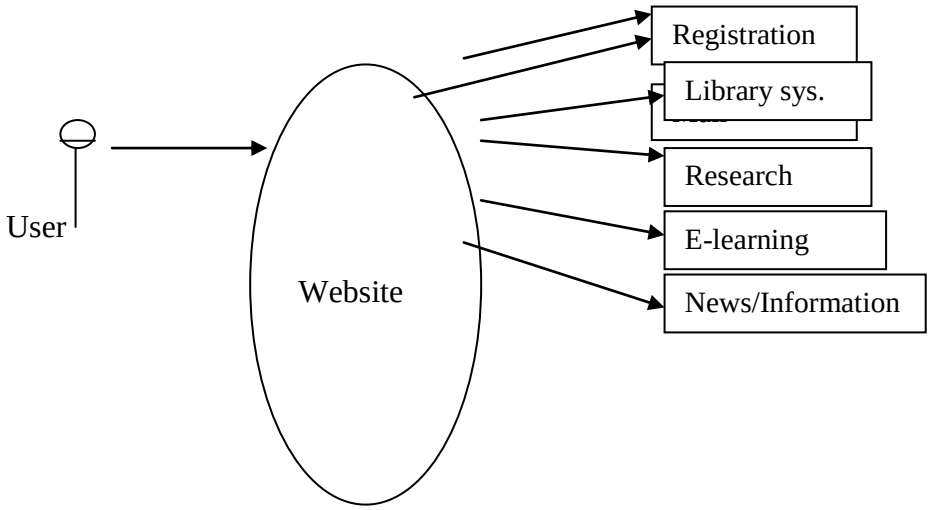


Figure 5.1: Services Accessed through the Website

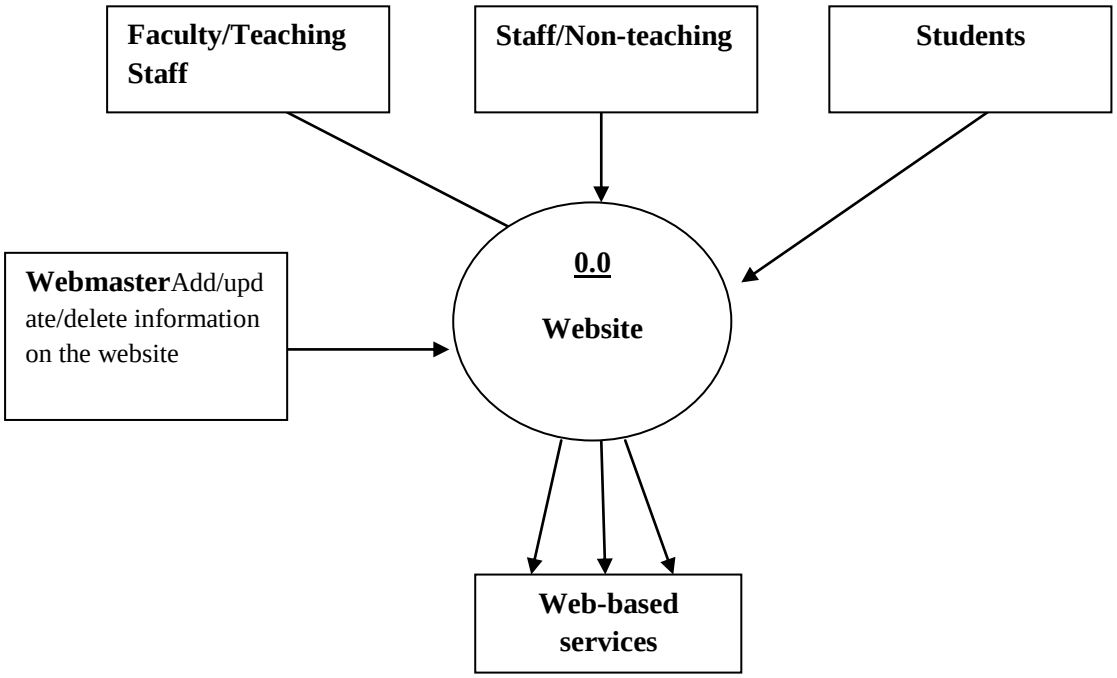


Figure 5.2: Context Level DFD

During the design phase the modules were identified, their specifications made and the relationship between the modules in terms of how the interact were identified. Each structural module was analyzed, in order to lay the foundation for the construction of the software. According to the functional requirements, the software tool was divided into two modules: user module and administrator's module. The user

module is used by website user in giving feedback while the administrator's module is used by administrator to access the feedback from users in summary report form.

5.2.4: Coding

Coding of the system utilized the use of PHP, CSS and JavaScript. The actual coding was done using the two programming languages. The PHP code written was sent to the browser as HTML and hence the browser displays the output on the screen. Javascript was used to do field validation and validate entries from the users. Javascript code has been embedded in a HTML file and the browser fetches it when executed.CSS has been used the designing, colour and styling of the HTML structure.

The software structure design was completed in the overall design phase. This phase was divided into two modules, the function of each module and the links between them are discussed below. The first module is the user module. The user log in using their ueab e-mail address and gives their suggestions, opinions or feedback. Users can edit the information and modify it before submitting it. The tool can be accessed online using the link elearning.ueab.ac.ke/web. The design of the user interface module for logging in and providing feedback are captured in the images as below:

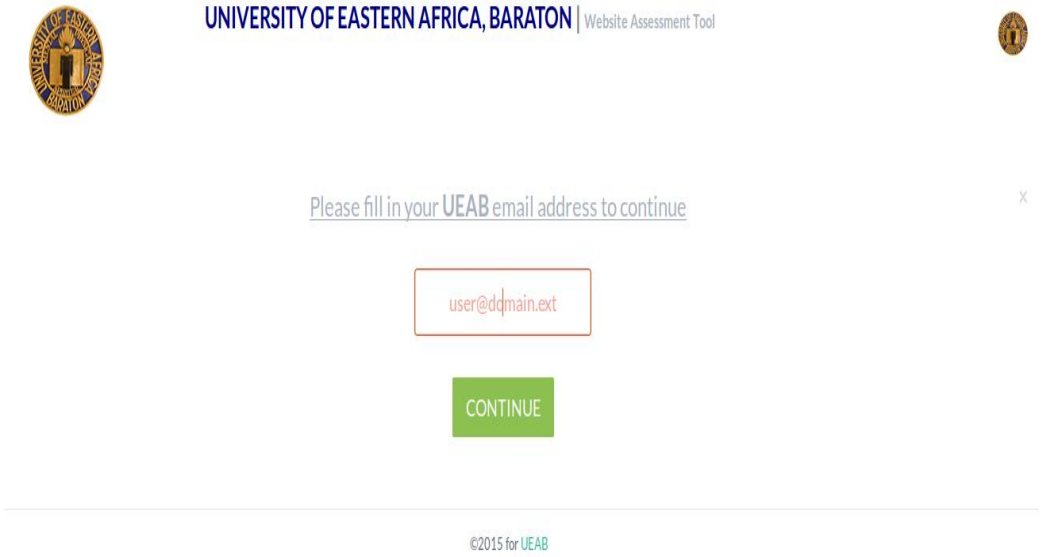


Figure 5.3: User Login Interface

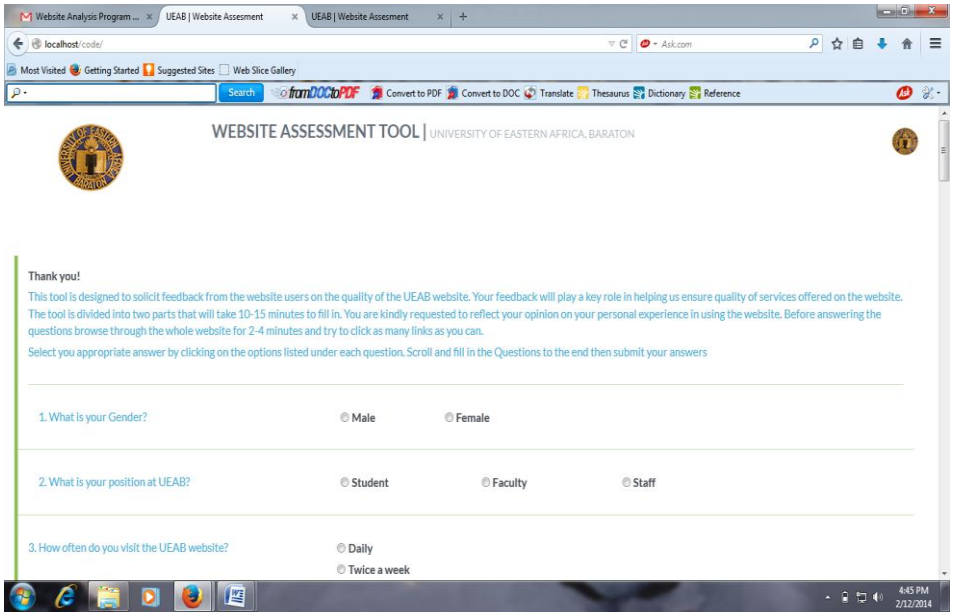
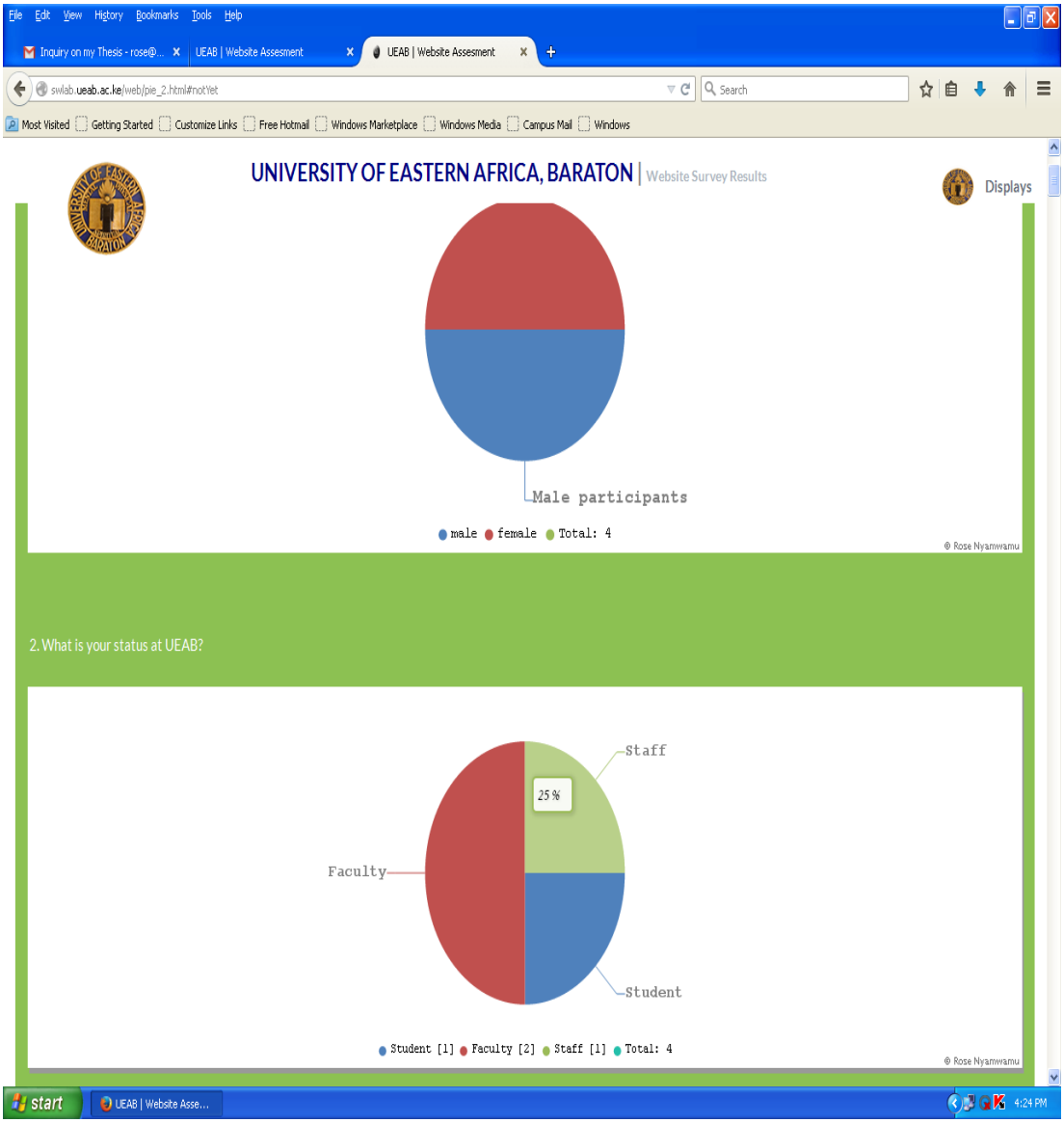


Figure 5.4: User Feedback Interface

The second module is the results module. The webmaster who is the administrator log into the software which is also web-based using a username and a password so as to view the results. This module is linked to the user module and it is to be used by the webmaster to access the feedback from the users. The feedback is presented in report

summary forms that are graphically represented by piecharts. The summary entries of each question are indicated at the bottom of each piechart or graph. The results can be accessed using the link elearning.ueab.ac.ke/web/access.php. The tool works as decision support software that aids in decision making. Below are images of the administrators interface module:


File Edit View History Bookmarks Tools Help
Inquiry on my Thesis - rose@...
UEAB | Website Assesment
UEAB | Website Assesment
swlab.ueab.ac.ke/web/pie_2.html#notYet
Search
Most Visited
Getting Started
Customize Links
Free Hotmail
Windows Marketplace
Windows Media
Campus Mail
Windows
UNIVERSITY OF EASTERN AFRICA, BARATON | Website Survey Results
Displays
Male participants
male
female
Total: 4
© Rose Nyamwamu
2. What is your status at UEAB?
Staff
25 %
Faculty
Student
Student [1]
Faculty [2]
Staff [1]
Total: 4
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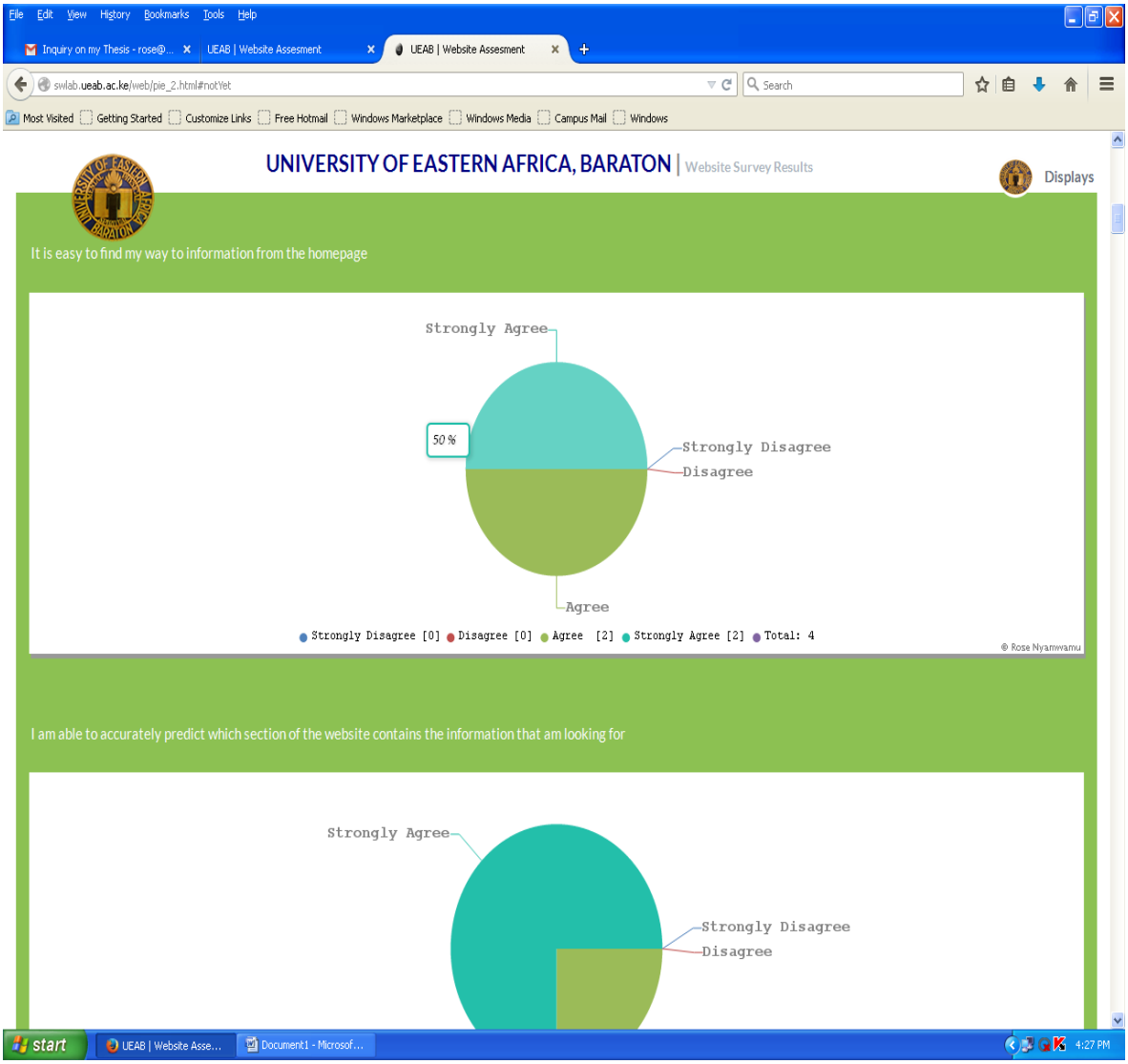

Figure 5.5: Summary Reports Interface

MySQL has been used as the backend database.MySQL is an open source relational database management system (RDBMS) that uses Structured Query Language (SQL), the most popular language for adding, accessing, and processing data in a database. MySQL is noted mainly for its speed, reliability, and flexibility. It is fast, robust and scalable relational database management system. It is a true multi-user, multi-threaded SQL (structured programming language) database server. The database design of the software followed the objectives of system requirements. MySQL Server has been

used to store the most important data tables which contains user details table, website constructs information and opinions.

In constructing the database, the relationship between the various entities was determined to be of one to many: the administrator manages users, information, news, links, and other web-based applications. A user on the other hand issues one or many service requests.

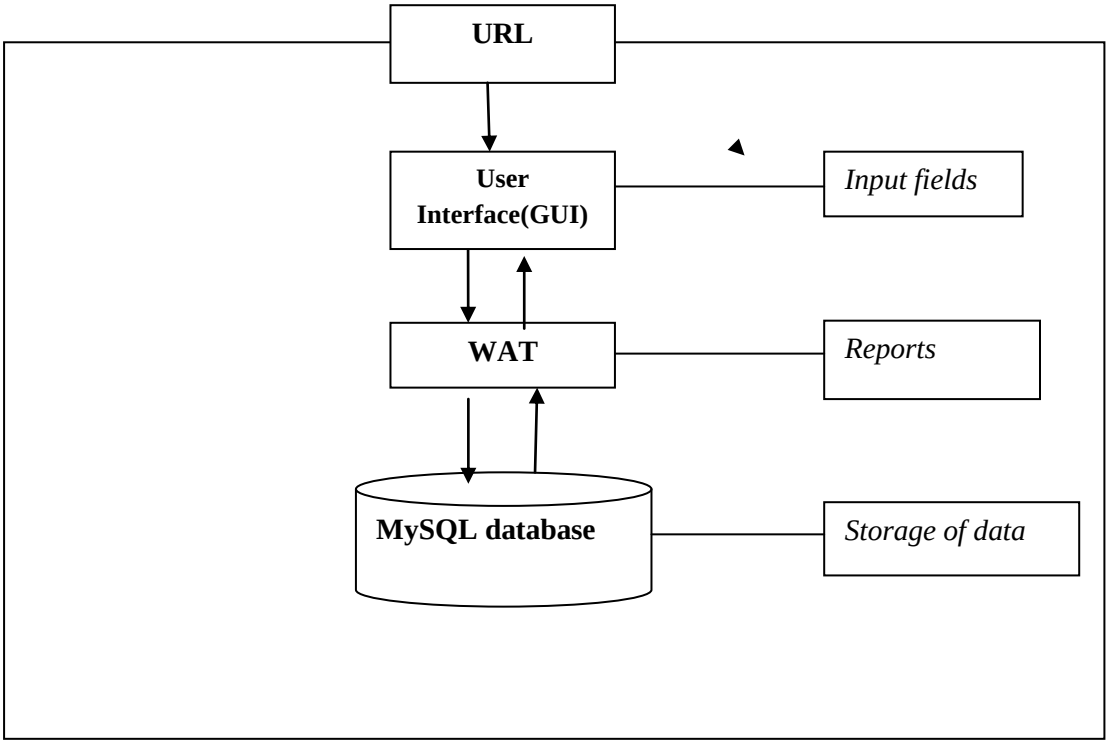

Figure 5.6: Overview of the Architecture and Software Parts Works

Figure 5. 6 shows the architecture and software parts used in the implementation of the assessment tool. The comprehensive website assessment framework aided the structure of the program design. The website assessment tool assesses the websites automatically, achieving the website evaluation process.

5.2.5: System Implementation

This stage builds on the results of all the prior stages. This phase involved deploying and making the website assessment tool available for the users. Software validation was done after the tool was constructed to determine whether it satisfied specified requirements. The tool was refined and implemented to fit the objectives of the study by slowly adding and increasing its functionality or performance which will be a continuous process.

Conducting acceptance involved testing of the WAT and obtaining approval to fully implement the system is the next stage in this phase. The installation of the WAT in the production environment was done after the necessary university procedures were followed. Before the actual implementation of WAT into operation, a test run of the system was done to remove the bugs. The testing processes of WAT were used to identify the defects encountered in it. Using the test data, test run were carried out on WAT. Unit testing was done on individual modules separately. Each module interface was tested to ensure that information properly flows into and out of the program unit. The modules were checked to ensure that they functioned as required and that it adds user feedback and other details and also ensured that this data is sent to the database. The success of each individual unit paved way for integration testing. All identified errors were dealt with. Integration testing was done after different modules had been put together to make a complete system. Integration was aimed at ensuring that modules are compatible and they can be integrated to form a complete working system. Actual data was used to test the software tool and the result matched the expectations of the study.

Maintainability test was carried out to determine how easy it is to maintain the software. Given the feedback from the tool, the results can easily be interpreted and decision can quickly be made. The tool can also be easily modified, edited and regular tests can be carried out on the tool.

5.2.6: The Role of the Webmaster

The webmaster can access the raw data which is on a worksheet but reports from the database can be viewed. He/she will also be in charge of determining when the surveys will be done and clearing the previous data bank in consultation with the ITS manager. The researcher will schedule some training session with the webmaster to ensure that he/she is able to comfortably work with the tool.

Training system users and other affected personnel which includes all the users of the website on how to use the WAT will be done by the ITS department. The department will determine when the other users of the website will be trained, and how frequent the assessment of the website will be done through available procedures. The webmaster should be able to update, edit and delete information on the WAT as a maintenance process. Regular maintenance can be carried out to determine which aspects of the tool are irrelevant in regards to changes in consumer needs. No additional hardware or software will be required in the installation of the WAT. Once the WAT is implemented changes and growth in requirements are a reality on every software project so there is need to timely update them.

5.3 Chapter Summary

In summary, the system development approach is presented in this chapter describing how the software tool was developed. This approach calls for one to take time to do

the actual coding of the software which may take more time. The WAT developed in this chapter will provide feedback from users which in turn will be used to provide valuable inputs to improve the website. Further, university administrators may deploy the software tool that can be used to carry out surveys on the website and collect data from the website users. The website users can be able to give their feedback by filling in the tool linked to the website. The input on this designed tool is sent to a database from which the summary of the responses can be viewed by the webmaster for decision making. It is important to note that feedback from website users is important since it helps the management satisfy the constantly changing demands of the website users which further gives the administrators extensive opportunities in improve the quality of the services provided on the website hence meet user satisfaction. Quality web presence is the mirror of a university's performance.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter presents the conclusions, recommendations and direction for future work of the study. The chapter is divided into five sections which include: summary, findings, conclusions, recommendations and direction for future studies.

6.1 Summary

The purpose of this study was to assess the UEAB website in terms of service delivery and user satisfaction based on the research parameters which would lead to the development of a website evaluation tool based on the findings of the study.

The study integrated the UTUAT theory with the Offut model of web application quality. UTUAT has been used as an assessment tool in determining the success for the introduction of new technology and the behavior of the users.

The pilot study was conducted two weeks prior to the administration of the questionnaire so as to establish the reliability and validity. The sampling method included systematic and simple random sampling techniques. The sample size included the students, teaching staff(faculty) and non-teaching staff (support staff). The total of 394 respondents participated in this study including 240(53%) students, 80(21%) non-teaching staff and 81(25%) teaching staff.

Data was analyzed using both descriptive and inferential statistics in relation to the research objectives. The level of significance adopted was .05.

6.2 Findings

The quantitative findings presented in Chapter Four formed the basis of the conclusions presented below:

Based on the respondents profile, the researcher concluded that:

a) A large percentage of the participants were students
b) Most of the students visit the website twice a week while the faculty and staff visit the website on a daily basis.

Based on the findings, it is evident that:

On usability items: It is easy for the website users to find information from the homepage and that the users are able to predict which section or tab on the website contains the information that they need. However, there is need for improvement of the homepage and the general features or characteristics of the website so as to make it more appealing. In addition to that, the website needs to be made user friendly especially for first time visitors. The ANOVA test on item 1 in this category indicated that the respondents were of similar views while items 2,3,4 and 5 indicate that the respondents were of different opinions.

On functionality items: The users of the website are satisfied with the functionalities of the website but administrative tools need to be enhanced. The ANOVA test showed that the respondents were of similar views on assessing items 1,2,3 and 4 , however they had different opinions on item 5.

On efficiency items: The services and functionalities of the website need some improvement even though the users find it easy to use the website. The users need to dialogue area and prompt feedback features availed at all times. The ANOVA test

showed that the respondents were of similar opinions in assessing items in this category.

On reliability items: The information on the website is consistent, website contains no broken links but the information posted on it is not regularly updated. The ANOVA test on items 1 and 5 in this category indicated that respondents were of similar views while they were of different opinions on items 2,3 and 4.

On availability items: The results from the analysis of these items indicated that the users are satisfied with four of the items in this category but based on the item on communications on downtime a lot of the users were not satisfied. ANOVA test indicated that respondents were of similar views in assessing items 1,2,3 and 4 but they were of different opinions on item 5.

On security items: It is evident from the items in this category that the website users are not aware of the security policies regarding protection of information. They only know that their information is protected from malicious attacks. The ANOVA on the other hand indicated that there was significant difference in the assessment of Items 1,2,4 and 5 by the respondents but the respondents were of similar views in assessing Item 3.

The findings from this study also indicate that the respondents indicated that it is easy to understand the information posted on the website. They also indicated that regular updates are not done which exert negative influence on the quality of services offered to the users'. However, it is evident that the institution is concerned with the quality of the website which is an essential strategy of organizations' success that yields a competitive advantage against competitors.

It was also evident that the website users are more concerned with usability which the respondents weighted highest, followed by functionality, efficiency, reliability, availability and lastly security. Website usability is concerned with how easy and intuitive the website is for individuals to use and interact with it regardless of whether they are using it for the first time or regular users. It is greatly associated with a positive attitude toward the website which should have an appealing home page and being able to predict where to get the information they are looking for.

From the study findings, it is evident that users of the website indicated that interactivity and content be included as a quality determinant of a good website. A lot can be achieved if this attribute is included and implemented as a quality service factor as discussed in the findings. The interactive features of a website allows students to have a glimpse not only to the academic programs offered by the institution but also the location, facilities and resources of the university as the website can be enhanced to have pictures, movies, virtual tours of the institution and other information. It would also include feedback communication, use of paybills and the integration of twitter and facebook on the website, timely response to queries and a wider accessibility through various types of phones. Timely communication of feedback is also key in ensuring interaction between the users and the webmaster.

6.3 Conclusion

The results of the case study showed that the WAM used to evaluate the website was effective even though the additional quality attributes would give broader results from the users' perspectives. It is evident that website assessment is not a onetime task, hence, using the automated tool presented here will make frequent assessments possible and easier. Although the system is easy to use by most users, first time users

might find it somehow hard at the beginning to navigate. The users of the website are satisfied with its functionalities but administrative tools that are very helpful to the users need to be put in place so as to enhance functionality, that the services offered and the functionalities of the website are not perfect and hence should be improved by the use of graphics. Also, the information posted on the website should also be regularly updated and it must be very timely.

Further the results indicate that the website is reliable but the information posted is not regularly updated causing a delink in information flow. On communication, the website users need to receive notices when there are website downtimes and when services are expected to resume. Moreover, the website users are more concerned with usability which the respondents weighted highest, followed by functionality, efficiency, reliability, availability and lastly security. It is important for the website users to be aware of the security policies that concern information posted on the website or information they post on it and that interactivity should be considered as one of the parameters to be used in assessing the website.

As a result of the findings, there was need to develop an online assessment tool. The tool was developed and is to be integrated with the UEAB website. This tool will enable the webmaster to carry our regular assessments and user satisfaction analysis in order to improve the website.

6.4 Recommendations

Based on the findings of the study, the researcher recommends the following:

1. The findings of this study should be used as a baseline by the ITS department to improve service delivery and hence improve the users satisfaction of the website services.

2. The website should be improved in terms of interaction and communication. It should be made more interactive where more use of electronic communication like blogging, chatting, twitting, access by a range of smart phones, automating of students services through the website like sign-out, timely feedback on posts, electronic mail for all users which should be integrated so as to enhance information flow and communication on downtimes which can be done through the notice boards.
3. The ITS department should organize for the website user training for new students (first time users) or have a documentation that can help the users in use of the website. They should also have an online tutorial that the users can also read on website use.
4. The website users need to be made aware of the information security policies in the institution. The ITS department should send the information policy document to the users through e-mail or conduct training sessions for the website users.
5. The higher leaning institutions needs to understand the importance of using interactive opportunities and social media communication as an instrument provided for by the internet and it should be taken advantage of.
6. Apart from their expertise, the website designers should follow design rules to come up with quality websites that serve the audience for whom they are meant for. The results from the study indicate that website assessment educates web designers on the context to which particular websites should be designed.
7. The webmaster should integrate Google Analytics with WAT to enhance efficiency and effectiveness in website assessment.
8. To improve on online visibility, institutions of higher learning should improve and update their online repository.

9. UEAB as an Organization should adopt and frequently use the WAT, which is online assessment tool to assess the quality of its website services and analyze user feedback in order to improve its services over time and help in benchmarking against competitors.

6.5 Directions for Future Work

Based on the findings of this study, the following suggestions for further research studies were made:

1. An investigation to find out how the institutions of higher learning are adopting to changes in technology and at the same time ensuring that they are offering quality services to their customers especially through the web based applications.

2. An investigation to find out how higher learning institutions are affected by user satisfaction of web based services.

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APPENDICES

Appendix 1: Questionnaire

Dear Respondent,

The researcher, a Master of Philosophy in Information Technology students is glad to have you as one of the respondents to this questionnaire. This questionnaire is designed to collect data on service delivery and user satisfaction of the UEAB website. Please take a few minutes to answer the questions below. Kindly respond to all the items in the questionnaire. Your response will be strictly confidential and anonymity will be ensured. Put a tick (✓) alongside the option that is applicable to you or fill in the spaces provided. DO NOT indicate your name on this questionnaire. The data will be processed objectively, so answer the questions truthfully.

Demographic Data

1. What is your status student ☐ faculty ☐ or staff?

   A. If student what is your year of study?

   I ☐ II ☐ III ☐ IV ☐

   B. If faculty or staff

In which building are you stationed?

Administration ☐ Humanities ☐ Science ☐

Technology ☐ Library ☐ Hostel ☐ Other ☐

2. How often do you visit the UEAB website?

Twice in a day ☐ Twice in a week ☐ Daily ☐

Once in a semester ☐

Kindly rate the following attributes of a website in terms of service delivery and user satisfaction. Put a tick (✓) alongside the option that is applicable to you in the spaces provided.

Rate the statement using the 1- 5 point Likert scale provided where (5 = strongly agree, 4=agree, 3=neutral, 2=disagree, 1=strongly disagree).

3. Usability of the Website

Statements	**5**	**4**	**3**	**2**	**1**
It is easy to find my way to information from the homepage					
I am able to accurately predict which section of the website contains the information that am looking for					
The homepage content makes me want to explore the site further					
The website is well suited to first time visitors					
The site has characteristics that make it appealing.					

4. Functionality of the Website

Statements	**5**	**4**	**3**	**2**	**1**
The website contains administration tools which enhance efficiency i.e. Help, FAQ					
All functionality if clearly labeled					
It is easy to navigate the website i.e. options to return to home page, top of pages is provided.					
There are linkages to other sites that have discussions on similar topics					
The selected graphics serve a functional purpose.					

5. Efficiency of the Website

Statements	**5**	**4**	**3**	**2**	**1**
I find it easy to use the website.					
The information posted on the website is always timely.					
I'm satisfied by the web content.					
The web services and functionalities are perfect.					
The website offers dialogue areas or feedback features for visitors					

6. Reliability of the Website

Statements	**5**	**4**	**3**	**2**	**1**
The website is accessible all the time.					
The links work well.					
The forms on the website are working					
The website contains some broken links.					
Information on the website is regularly updated.					

7. Availability of the Website

Statements	**5**	**4**	**3**	**2**	**1**
The website is available 24/7.					
I always get the information and services that I need from the website.					
There is communication when the website is down.					
The website takes a very short time to load.					
The network infrastructure in the institution is very good and so I can access the website from anywhere on campus.					

8. Security of the Website

Statements	**5**	**4**	**3**	**2**	**1**
I'm aware of the security policies regarding information protection in the institution.					
I believe that the website is well protected.					
The website is protected from malicious attacks.					
The website protects unauthorized modification to information.					
The website is secure so as to avoid loss of information					

9. Service Quality

Statements	**5**	**4**	**3**	**2**	**1**
The content on the website is regularly updated					
The information posted on the website is valid and accurate					
The information presented is easy to understand					
The content on the website is varied and changing (dynamic)					
The website shows that the institution considers service quality.					

10.What weight would you assign to each of these attributes given the range of 1-5 where 5 is the most important and 1 the least important

Statements	**5**	**4**	**3**	**2**	**1**
Usability					
Functionality					
Reliability					
Efficiency					
Security					
Availability					

11. In your own opinions what improvements would you want to see on the university website?

_____

_____

_____

_____

12. In your opinion is there any other attribute(parameters) that you think should be considered in evaluating the institutions website?

_____

_____

_____

_____

13. Is there any services that you would wish was offered by the website?

_____

_____

_____

_____

Appendix 2: Research Authorization

OFFICE OF THE DIRECTOR OF GRADUATE STUDIES AND RESEARCH

UNIVERSITY OF EASTERN AFRICA, BARATON

P. O. Box 2500-30100, Eldoret, Kenya, East Africa

10 October 2012

Ms. Rosaline Nyamwamu
Department of Information Systems and Computing
UEAB

Re: ETHICS CLEARANCE AND DATA COLLECTION APPROVAL (REC: UEAB/010/08/2012)

Your research proposal entitled ***Design and Development of a Website Evaluation Tool for the University of Eastern Africa, Baraton*** was discussed by the Research Ethics Committee (REC) of the University and was ethically cleared. Furthermore, your request to gather data from the University of Eastern Africa, Baraton web users was approved. Please coordinate with the Office of Graduate Studies and Research in the data collection.

This approval is with the understanding that you provide UEAB a copy of the thesis after it has been defended.

We wish you success in your research.

Sincerely yours,

Prof. Elizabeth M. Role, PhD
Chairperson, Research Ethics Committee

UNIVERSITY OF EASTERN AFRICA Director 10 OCT 2012 Center for Research & Statistics BARATON

A SEVENTH-DAY ADVENTIST INSTITUTION OF H IGHER LEARNING
CHARTERED 1991

Appendix 3: Group Descriptive Analysis Tables and Anova Analysis

Group descriptive statistics on Usability

Status of respondent		It is easy to find my way to information from the homepage	I am able to accurately predict which section of the website contains the information that am looking for	The homepage content makes me want to explore the site further	The website is well suited to first time visitors	The site has characteristics that make it appealing	Mean of usability variables
Student	Mean	3.9540	3.6067	3.4979	3.5439	3.5439	3.5766
	N	239	239	239	239	239	239
	Std. Deviation	1.06608	1.16502	1.23627	1.25237	1.25237	.91951
Faculty	Mean	4.0494	3.8025	3.7407	3.7037	3.7037	3.8000
	N	80	80	80	80	80	80
	Std. Deviation	.87894	.90027	1.00968	.62138	.62138	.63325
Staff	Mean	3.5067	3.7733	2.8400	3.3067	3.3067	3.2000
	N	75	75	75	75	75	75
	Std. Deviation	.64459	.48136	1.05318	.67730	.67730	.53927
Total	Mean	3.8886	3.6785	3.4228	3.5316	3.5316	3.5509
	N	394	394	394	394	394	394
	Std. Deviation	.97832	1.01782	1.19474	1.06198	1.06198	.82666

ANOVA on Usability

			Sum of Squares	Df	Mean Square	F	Sig.
It is easy to find my way to information from the homepage * Status of respondent	Between Groups	(Combined)	14.056	2	7.028	7.589	.001
	Within Groups		363.043	392	.926		
I am able to accurately predict which section of the website contains the information that am looking for * Status of respondent	Between Groups	(Combined)	3.152	2	1.576	1.525	.219
	Within Groups		405.015	392	1.033		
The homepage content makes me want to explore the site further * Status of respondent	Between Groups	(Combined)	35.010	2	17.505	13.011	.000
	Within Groups		527.385	392	1.345		
The website is well suited to first time visitors * Status of respondent	Between Groups	(Combined)	51.119	2	25.560	20.554	.000
	Within Groups		487.453	392	1.244		
The site has characteristics that make it appealing * Status of respondent	Between Groups	(Combined)	6.230	2	3.115	2.787	.063
	Within Groups		438.124	392	1.118		
Mean of usability variables * Status of respondent	Between Groups	(Combined)	14.418	2	7.209	11.090	.000
	Within Groups		254.829	392	.650		
	Total		269.247	394			

Group descriptive statistic on Functionality

Status of respondent		The website contains administration tools which enhance efficiency i.e. Help, FAQ	All functionality if clearly labeled	It is easy to navigate the website i.e. options to return to home page, top of pages is provided	There are linkages to other sites that have discussions on similar topics	The selected graphics serve a functional purpose	Mean of functionality variables
Student	Mean	3.3556	3.5146	3.9163	3.2678	3.4519	3.5013
	N	239	239	239	239	239	239
	Std. Deviation	1.20707	1.23278	1.65047	1.17549	1.17609	.94467
Faculty	Mean	3.6543	4.4444	3.9259	3.9753	3.4938	3.8988
	N	80	80	80	80	80	80
	Std. Deviation	1.00200	4.53872	.81820	4.56337	.79252	1.44192
Staff	Mean	3.0667	4.4133	4.4267	4.0667	3.6000	3.9147
	N	75	75	75	75	75	75
	Std. Deviation	.68445	.83978	.82484	1.16634	.78843	.57626
Total	Mean	3.3620	3.8759	4.0152	3.5646	3.4886	3.6613
	N	394	394	394	394	394	394
	Std. Deviation	1.09826	2.33105	1.39607	2.33550	1.04067	1.03099

Anova Analysis on Functionality

			Sum of Squares	df	Mean Square	F	Sig.
The website contains administration tools which enhance efficiency i.e. Help, FAQ * Status of respondent	Between Groups	(Combined)	13.473	2	6.736	5.719	.004
	Within Groups		461.758	392	1.178		
All functionality if clearly labeled * Status of respondent	Between Groups	(Combined)	79.036	2	39.518	7.513	.001
	Within Groups		2061.885	392	5.260		
It is easy to navigate the website i.e. options to return to home page, top of pages is provided * Status of respondent	Between Groups	(Combined)	15.680	2	7.840	4.086	.018
	Within Groups		752.229	392	1.919		
There are linkages to other sites that have discussions on similar topics * Status of respondent	Between Groups	(Combined)	53.625	2	26.812	5.016	.007
	Within Groups		2095.479	392	5.346		
The selected graphics serve a functional purpose * Status of respondent	Between Groups	(Combined)	1.255	2	.628	.578	.561
	Within Groups		425.444	392	1.085		
Mean of functionality variables * Status of respondent	Between Groups	(Combined)	15.504	2	7.752	7.535	.001
	Within Groups		403.293	392	1.029		
	Total		418.797	394			

Group descriptive statistics on Efficiency

Status of respondent		I find it easy to use the website	The information posted on the website is always timely	I'm satisfied by the web content	The web services and functionalities are perfect	The website offers dialogue areas or feedback features for visitors	Mean of efficiency variables
Student	Mean	3.7615	3.2050	3.1883	3.0962	3.1925	3.2887
	N	239	239	239	239	239	239
	Std. Deviation	1.20818	1.24170	1.23759	1.15006	1.17956	.96693
Faculty	Mean	3.8272	3.2716	3.4074	3.2222	3.6296	3.4716
	N	80	80	80	80	80	80
	Std. Deviation	.83352	.97484	.83333	.85147	.95452	.68433
Staff	Mean	4.5067	3.6133	4.3200	3.6800	3.3333	3.8907
	N	75	75	75	75	75	75
	Std. Deviation	.86013	.88369	4.70526	.75624	1.08221	1.12095
Total	Mean	3.9165	3.2962	3.4481	3.2329	3.3089	3.4405
	N	394	394	394	394	394	394
	Std. Deviation	1.11547	1.13811	2.32602	1.05023	1.12912	.97397

Anova Analysis on Efficiency

			Sum of Squares	df	Mean Square	F	Sig.
I find it easy to use the website * Status of respondent	Between Groups	(Combined)	32.510	2	16.255	13.921	.000
	Within Groups		457.733	392	1.168		
The information posted on the website is always timely * Status of respondent	Between Groups	(Combined)	9.579	2	4.789	3.749	.024
	Within Groups		500.765	392	1.277		
I'm satisfied by the web content * Status of respondent	Between Groups	(Combined)	73.283	2	36.642	6.978	.001
	Within Groups		2058.403	392	5.251		
The web services and functionalities are perfect * Status of respondent	Between Groups	(Combined)	19.466	2	9.733	9.191	.000
	Within Groups		415.107	392	1.059		
The website offers dialogue areas or feedback features for visitors * Status of respondent	Between Groups	(Combined)	11.617	2	5.808	4.640	.010
	Within Groups		490.702	392	1.252		
Mean of efficiency variables * Status of respondent	Between Groups	(Combined)	20.784	2	10.392	11.541	.000
	Within Groups		352.968	392	.900		
	Total		373.752	394			

Group descriptive statistics on Reliability

Status of respondent		The website is accessible all the time	The information on the website is always consistent	The forms on the website are working	The website contains some broken links	Information on the website is regularly updated	Mean of reliability variables
Student	Mean	3.1464	3.5188	3.4895	3.0669	3.1130	3.2669
	N	239	239	239	239	239	239
	Std. Deviation	1.26669	1.09940	1.11469	1.09031	1.19162	.73738
Faculty	Mean	4.0247	3.7160	3.5926	3.1235	3.3704	3.5654
	N	80	80	80	80	80	80
	Std. Deviation	4.60156	.80985	.80277	1.02935	.96753	1.10127
Staff	Mean	3.1467	3.4400	3.4000	2.8400	2.8400	3.1333
	N	75	75	75	75	75	75
	Std. Deviation	.98218	.70212	.86992	.94497	.87054	.57171
Total	Mean	3.3266	3.5443	3.4937	3.0354	3.1139	3.3028
	N	394	394	394	394	394	394
	Std. Deviation	2.36132	.98204	1.01353	1.05376	1.10361	.81026

Anova Analysis on Reliability

			Sum of Squares	Df	Mean Square	F	Sig.
The website is accessible all the time * Status of respondent	Between Groups	(Combined)	49.659	2	24.830	4.533	.011
	Within Groups		2147.212	392	5.478		
The information on the website is always consistent * Status of respondent	Between Groups	(Combined)	3.360	2	1.680	1.749	.175
	Within Groups		376.614	392	.961		
The forms on the website are working * Status of respondent	Between Groups	(Combined)	1.455	2	.727	.707	.494
	Within Groups		403.279	392	1.029		
The website contains some broken links * Status of respondent	Between Groups	(Combined)	3.729	2	1.865	1.685	.187
	Within Groups		433.774	392	1.107		
Information on the website is regularly updated * Status of respondent	Between Groups	(Combined)	10.955	2	5.477	4.579	.011
	Within Groups		468.919	392	1.196		
Mean of reliability variables * Status of respondent	Between Groups	(Combined)	8.048	2	4.024	6.294	.002
	Within Groups		250.619	392	.639		
	Total		258.667	394			

Group descriptive statistics on Availability

Status of respondent		The website is available 24/7	I always get the information and services that I need from the website	There is communication when the website is down	The website takes a very short time to load	The network infrastructure in the institution is very good and so I can access the website from anywhere on campus.	Mean of availability variables
Student	Mean	3.0921	3.4477	2.5523	3.2678	3.1339	3.0987
	N	239	239	239	239	239	239
	Std. Deviation	1.35655	1.26540	1.26872	1.22107	2.93609	1.11549
Faculty	Mean	4.0988	3.5802	2.5802	3.3951	3.0000	3.3309
	N	80	80	80	80	80	80
	Std. Deviation	4.63574	1.08241	1.18178	1.15844	1.30384	1.29428
Staff	Mean	3.9467	3.1200	1.8533	3.9200	3.8133	3.3307
	N	75	75	75	75	75	75
	Std. Deviation	1.27230	.75265	1.17051	1.04958	1.45837	.66128
Total	Mean	3.4608	3.4127	2.4253	3.4177	3.2354	3.1904
	N	394	394	394	394	394	394
	Std. Deviation	2.44749	1.15514	1.26104	1.20076	2.45627	1.08941

Anova Analysis on Availability

		Sum of Squares	Df	Mean Square	F	sig
The website is available 24/7	Between Groups	83.170	2	41.585	7.159	.001
	Within Groups	2276.971	392	5.809		
I always get the information and services that I need from the website	Between Groups	8.992	2	4.496	3.411	.034
	Within Groups	516.745	392	1.318		
There is communication when the website is down	Between Groups	30.336	2	15.168	9.973	.000
	Within Groups	596.211	392	1.521		
The website takes a very short time to load	Between Groups	24.336	2	12.168	8.772	.000
	Within Groups	543.740	392	1.387		
The network infrastructure in the institution is very good and so I can access the website from anywhere on campus.	Between Groups	32.002	2	16.001	2.675	.070
	Within Groups	2345.102	392	5.982		
Mean of availability variables	Between Groups	5.082	2	2.541	2.153	.117
	Within Groups	462.522	392	1.180		
	Total	467.603	394			

Group descriptive statistics on Security

Status of respondent		I'm aware of the security policies regarding information protection in the institution	I believe that the website is well protected	The website is protected from malicious attacks	The website protects unauthorized modification to information.	The website is secure so as to avoid loss of information	Mean of security variables
Student	Mean	3.2845	3.4686	3.3891	3.4268	3.3431	3.3824
	N	239	239	239	239	239	239
	Std. Deviation	1.18933	1.05622	1.09777	1.06997	1.09596	.95804
Faculty	Mean	3.2346	3.4938	4.1358	3.6049	3.4444	3.5827
	N	80	80	80	80	80	80
	Std. Deviation	1.22751	.79252	4.57098	.75298	.79057	1.16499
Staff	Mean	3.1200	3.2133	3.3467	3.3467	3.4267	3.2907
	N	75	75	75	75	75	75
	Std. Deviation	.89985	.70315	.64710	.64710	.68128	.52432
Total	Mean	3.2430	3.4253	3.5342	3.4481	3.3797	3.4061
	N	394	394	394	394	394	394
	Std. Deviation	1.14735	.95128	2.26779	.94478	.97042	.94389

Anova Analysis on Security

			Sum of Squares	df	Mean Square	F	Sig.
I'm aware of the security policies regarding information protection in the institution * Status of respondent	Between Groups	(Combined)	1.552	2	.776	.588	.556
	Within Groups		517.116	392	1.319		
I believe that the website is well protected * Status of respondent	Between Groups	(Combined)	4.199	2	2.099	2.336	.098
	Within Groups		352.348	392	.899		
The website is protected from malicious attacks * Status of respondent	Between Groups	(Combined)	36.984	2	18.492	3.644	.027
	Within Groups		1989.305	392	5.075		
The website protects unauthorized modification to information. * Status of respondent	Between Groups	(Combined)	2.873	2	1.436	1.614	.200
	Within Groups		348.813	392	.890		
The website is secure so as to avoid loss of information * Status of respondent	Between Groups	(Combined)	.825	2	.413	.437	.646
	Within Groups		370.213	392	.944		
Mean of security variables * Status of respondent	Between Groups	(Combined)	3.660	2	1.830	2.065	.128
	Within Groups		347.365	392	.886		
	Total		351.025	394			

Group descriptive statistics on Service Quality

Status of respondent		The content on the website is regularly updated	The information posted on the website is valid and accurate	The information presented is easy to understand	The content on the website is varied and changing (dynamic)	The website shows that the institution considers service quality.	Mean of service quality
Student	Mean	3.3766	3.5690	3.7238	3.3264	3.5941	3.5180
	N	239	239	239	239	239	239
	Std. Deviation	1.14148	1.08196	1.13718	1.08183	1.07616	.89102
Faculty	Mean	3.3333	3.6173	3.8025	3.4321	3.5556	3.5481
	N	80	80	80	80	80	80
	Std. Deviation	1.11803	.92962	.99272	.97389	1.01242	.86820
Staff	Mean	3.3067	3.6800	3.5733	3.3200	3.9200	3.5600
	N	75	75	75	75	75	75
	Std. Deviation	1.06509	.82462	1.01573	.97482	1.12418	.75193
Total	Mean	3.3544	3.6000	3.7114	3.3468	3.6481	3.5322
	N	394	394	394	394	394	394
	Std. Deviation	1.12017	1.00607	1.08649	1.03919	1.07826	.85973

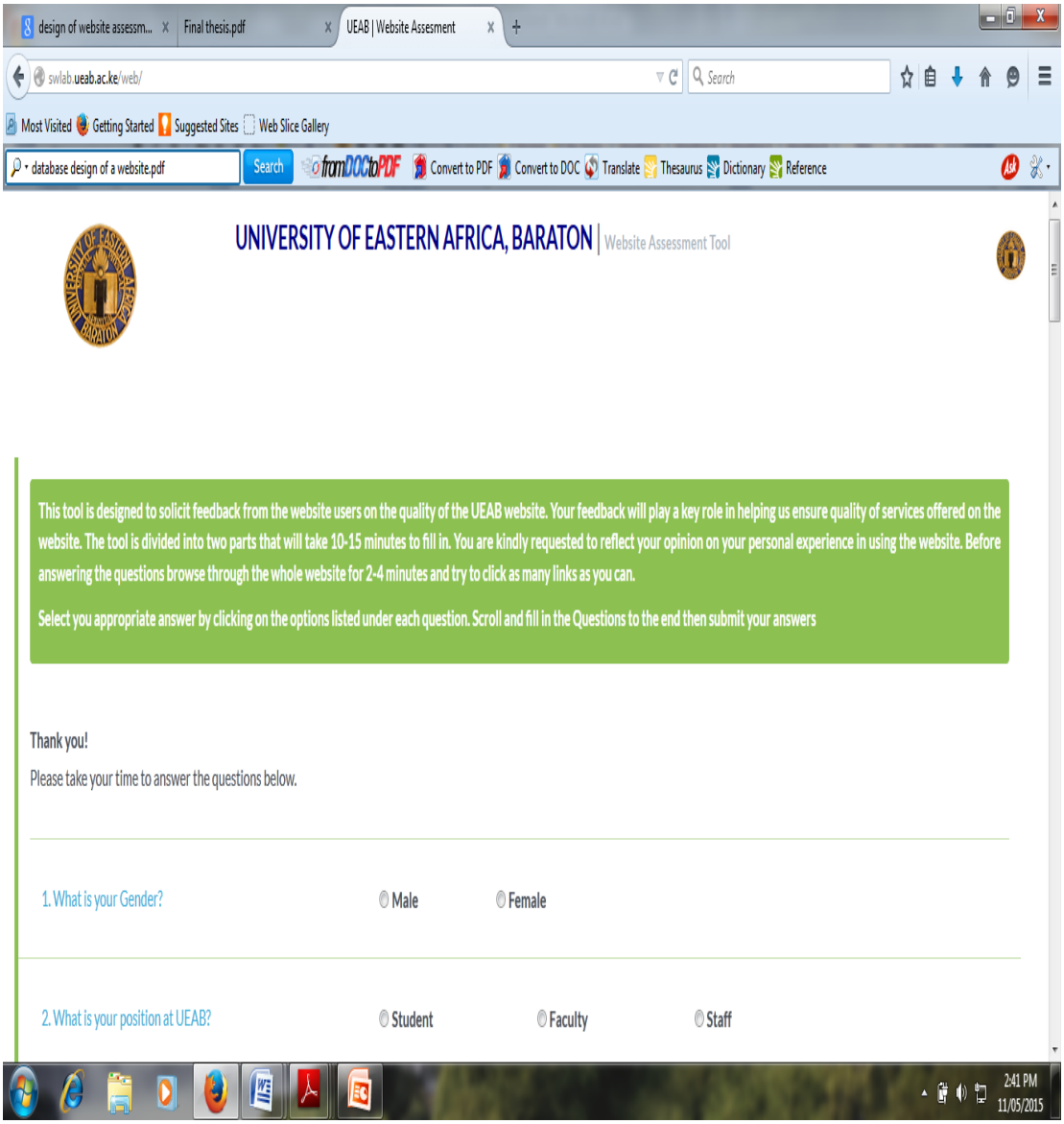
Anova Analysis on Service Quality

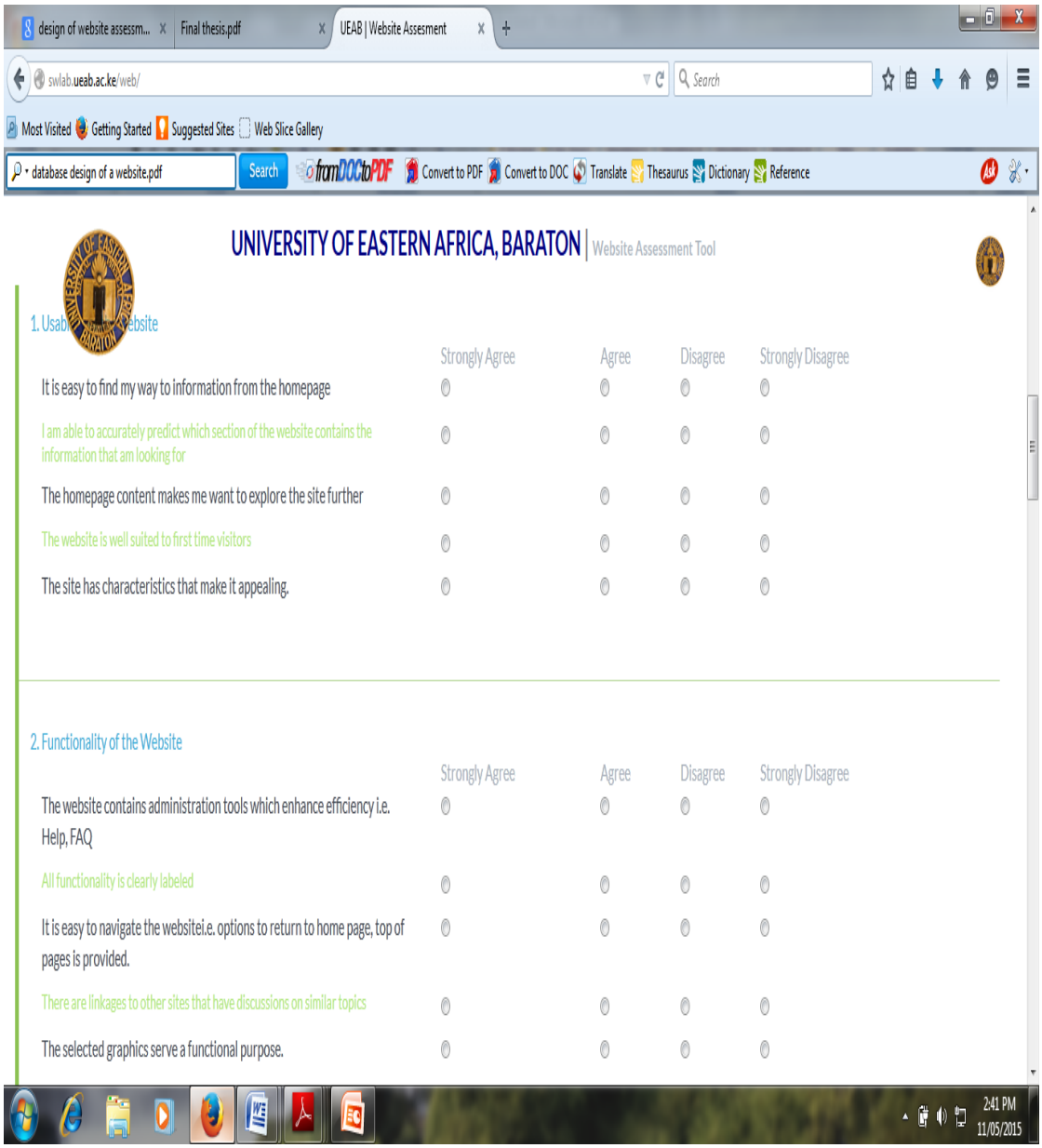
			Sum of Squares	df	Mean Square	F	Sig.
The content on the website is regularly updated * Status of respondent	Between Groups	(Combined)	.324	2	.162	.129	.879
	Within Groups		494.055	392	1.260		
The information posted on the website is valid and accurate * Status of respondent	Between Groups	(Combined)	.733	2	.367	.361	.697
	Within Groups		398.067	392	1.015		
The information presented is easy to understand * Status of respondent	Between Groups	(Combined)	2.139	2	1.069	.905	.405
	Within Groups		462.960	392	1.181		
The content on the website is varied and changing (dynamic) * Status of respondent	Between Groups	(Combined)	.743	2	.372	.343	.710
	Within Groups		424.740	392	1.084		
The website shows that the institution considers service quality. * Status of respondent	Between Groups	(Combined)	6.934	2	3.467	3.013	.050
	Within Groups		451.152	392	1.151		
Mean of service quality * Status of respondent	Between Groups	(Combined)	.127	2	.063	.085	.918
	Within Groups		291.095	392	.743		
	Total		291.222	394			

Appendix 4: The Assessment Tool

This tool is designed to solicit feedback from the website users on the quality of the UEAB website. Your feedback will play a key role in helping us ensure quality of services offered on the website. The tool is divided into two parts that will take 10-15 minutes to fill in. You are kindly requested to reflect your opinion on your personal experience in using the website. Before answering the questions browse through the whole website for 2-4 minutes and try to click as many links as you can.

Select you appropriate answer by clicking on the options listed under each question. Scroll and fill in the Questions to the end then submit your answers.





UNIVERSITY OF EASTERN AFRICA, BARATON | Website Assessment Tool

1. Usability of the Website

	Strongly Agree	Agree	Disagree	Strongly Disagree
It is easy to find my way to information from the homepage				
I am able to accurately predict which section of the website contains the information that am looking for				
The homepage content makes me want to explore the site further				
The website is well suited to first time visitors				
The site has characteristics that make it appealing.				

2. Functionality of the Website

	Strongly Agree	Agree	Disagree	Strongly Disagree
The website contains administration tools which enhance efficiency i.e. Help, FAQ				
All functionality is clearly labeled				
It is easy to navigate the websitei.e. options to return to home page, top of pages is provided.				
There are linkages to other sites that have discussions on similar topics				
The selected graphics serve a functional purpose.				

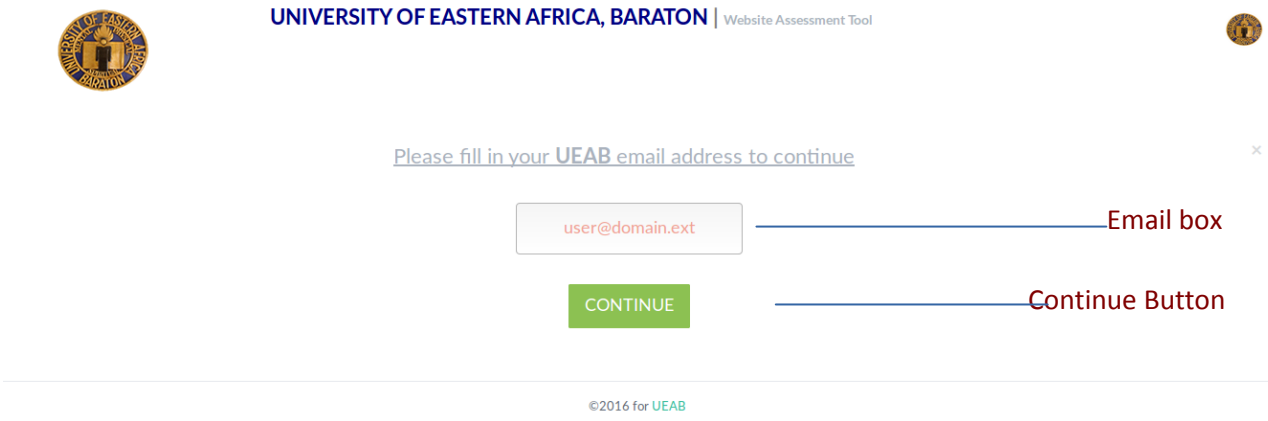
Appendix 5: User Manual

UEAB WEBSITE ASSESSMENT TOOL

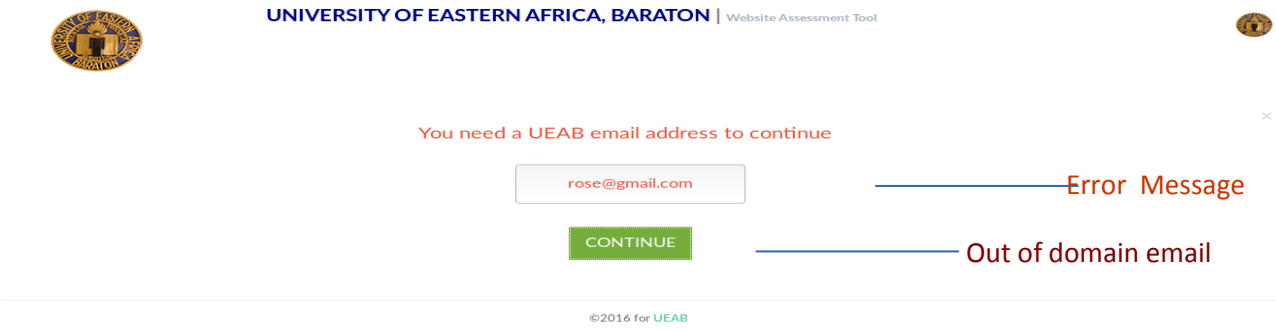
User Manual

1. USER

- One is required to enter their email address with the @ueab.ac.ke suffix in the email box then click the "continue" button to proceed.

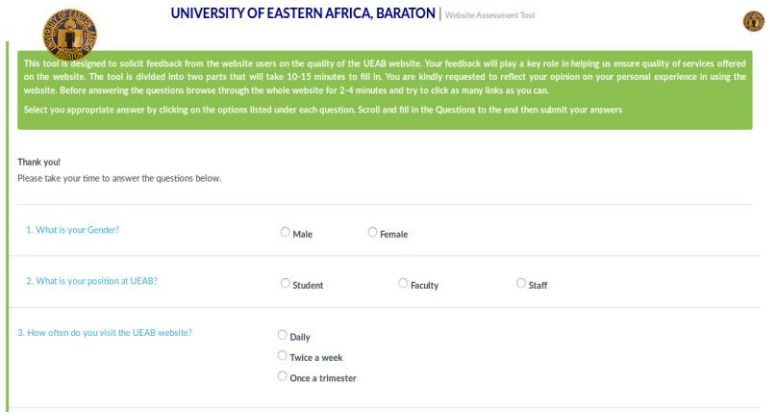


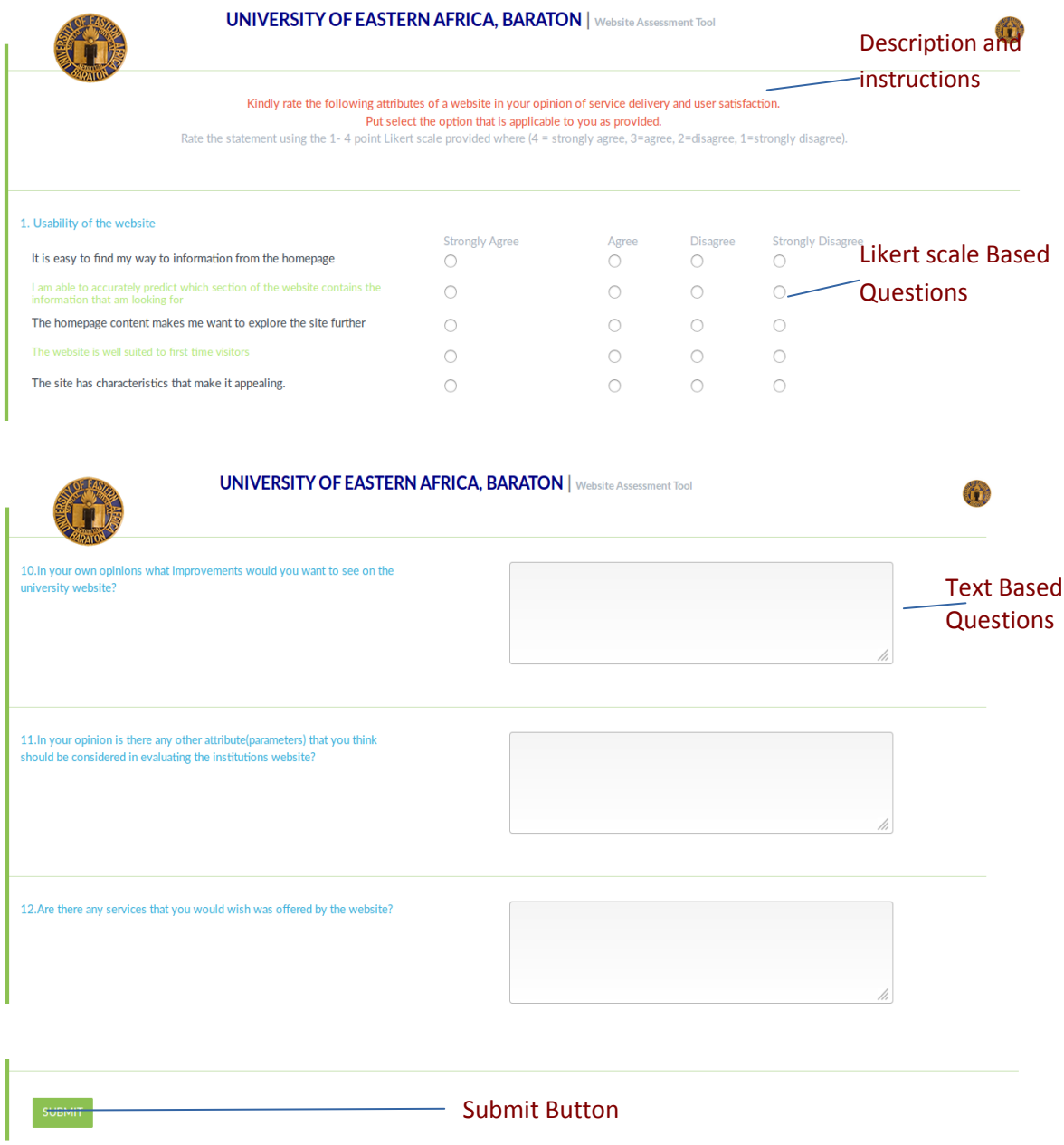
- In case an email address does not have the @ueab.ac.ke suffix, an error is displayed to let them know that this tool is locked for responses from this particular organization's domain.



- Upon successful login, the user is presented with a panel which has defined questions and a descriptive panel at the top.

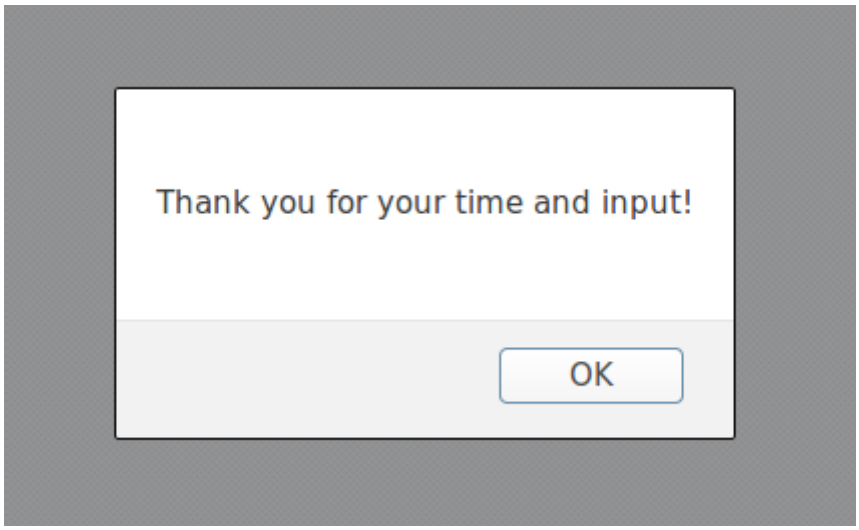
  One is required to answer all the questions and then submit the results.





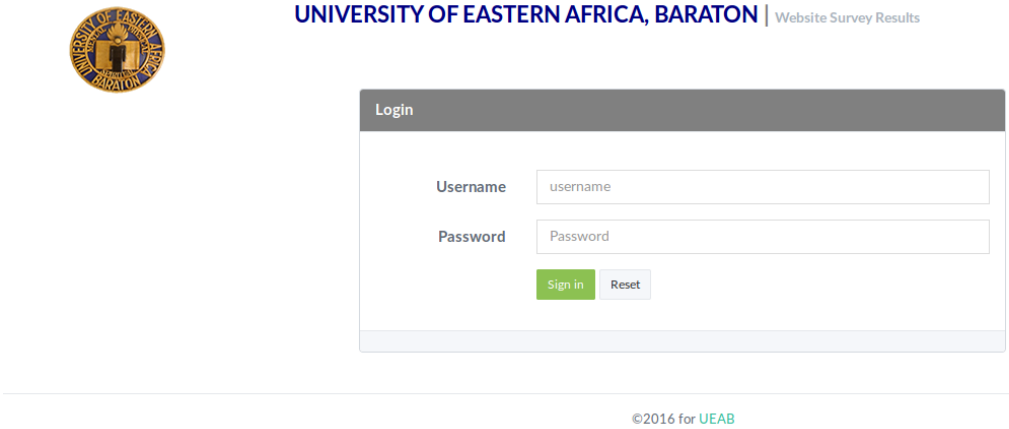
One will not proceed to submit the answers in the case of unanswered questions.

- Once the responses have been successfully recorded, the user gets an alert to thank them for their participation then redirects them back to the start page.

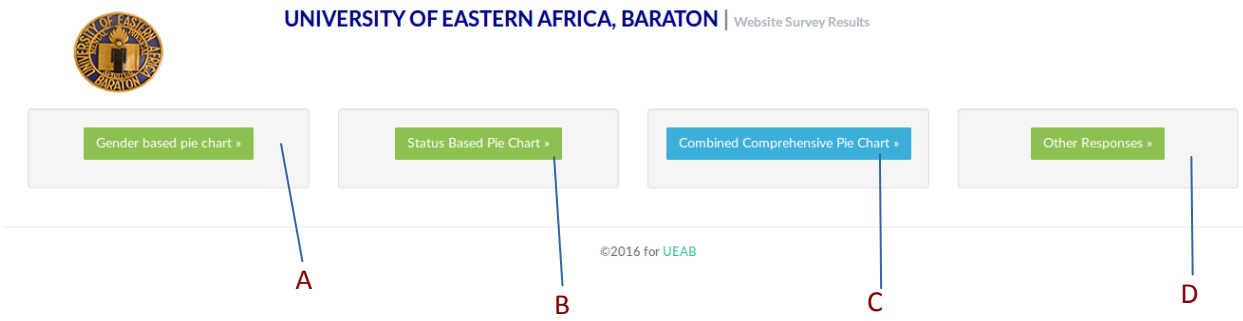


2. ADMINISTRATOR

- The administrative panel allows the administrator to access the charts that represent the responses of the various users.

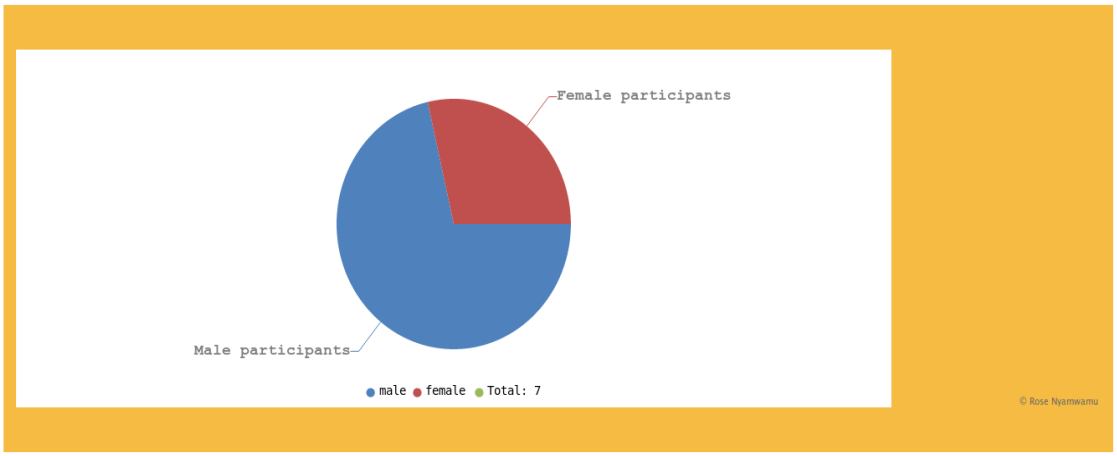


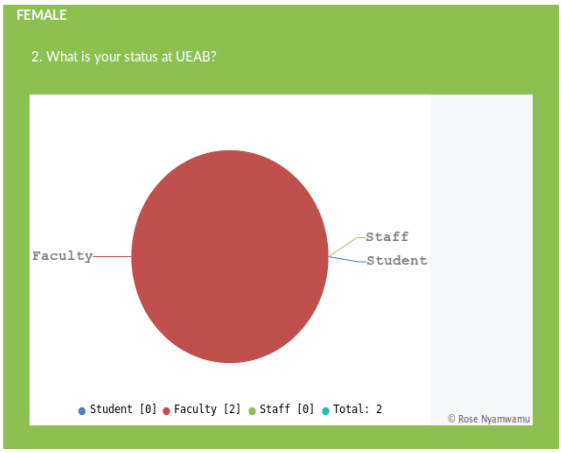
- Once logged in, the administrator has a panel presented before them such that they choose the format in which they want their data presented.

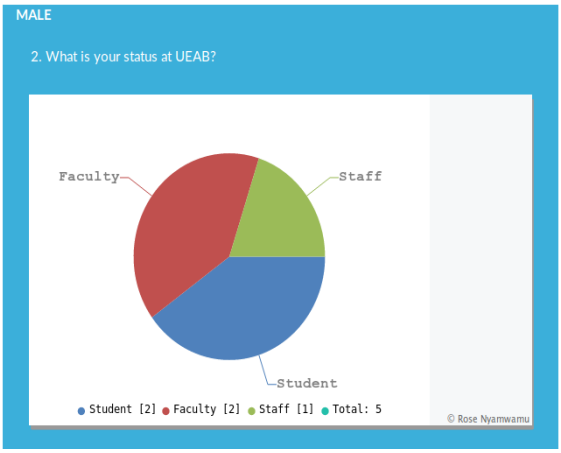


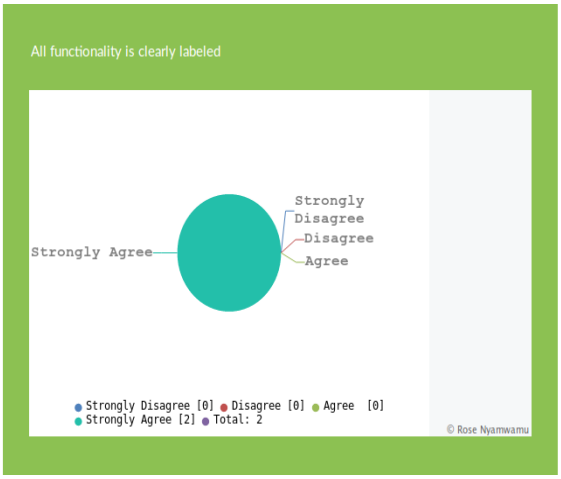
A) Gender Based Pie

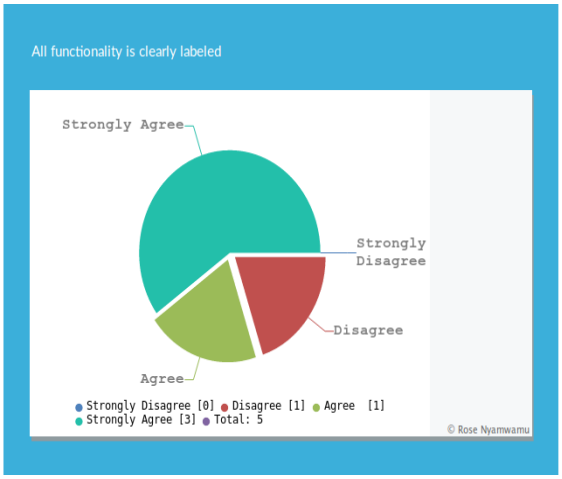
This allows the Administrator to get the user responses based on gender.





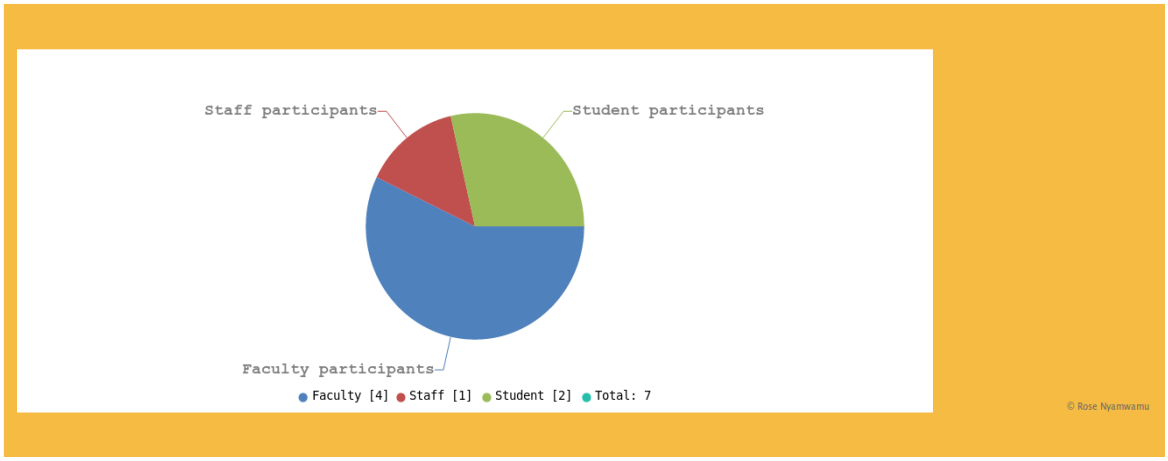


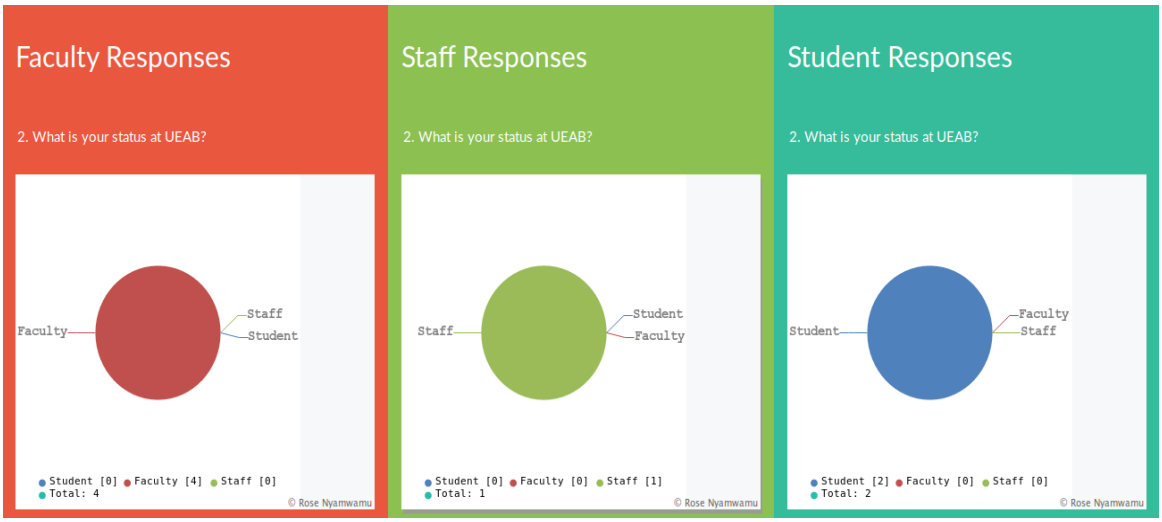


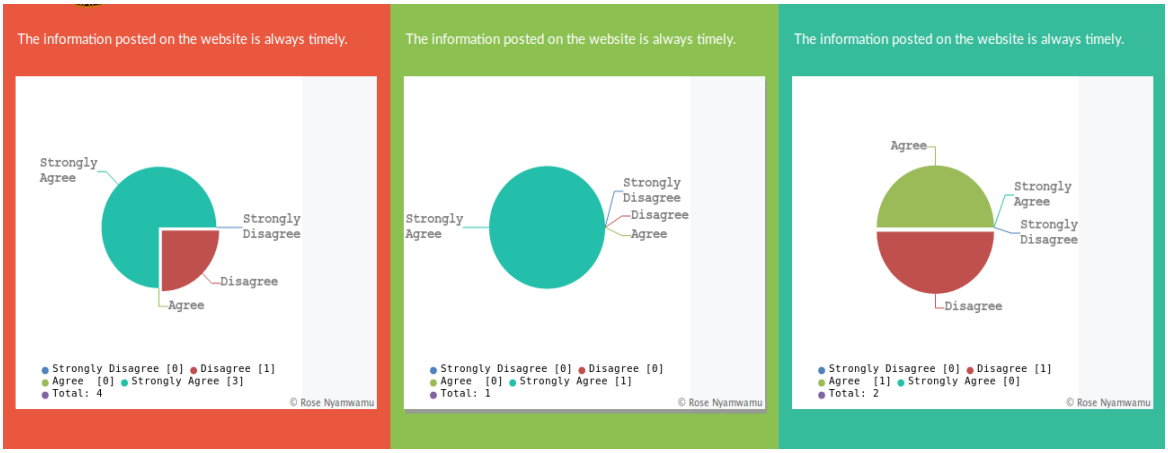


B) Status Based Pie

This allows the Administrator to get the user responses based on the status of the user.

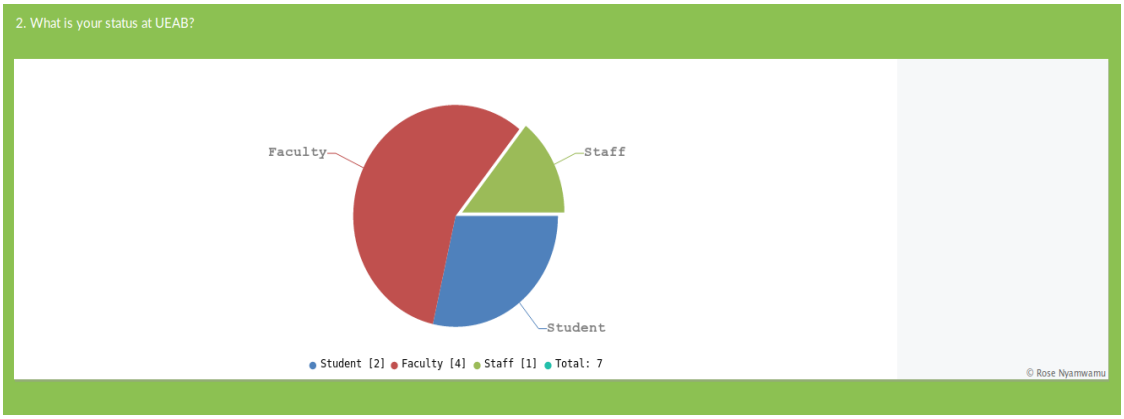


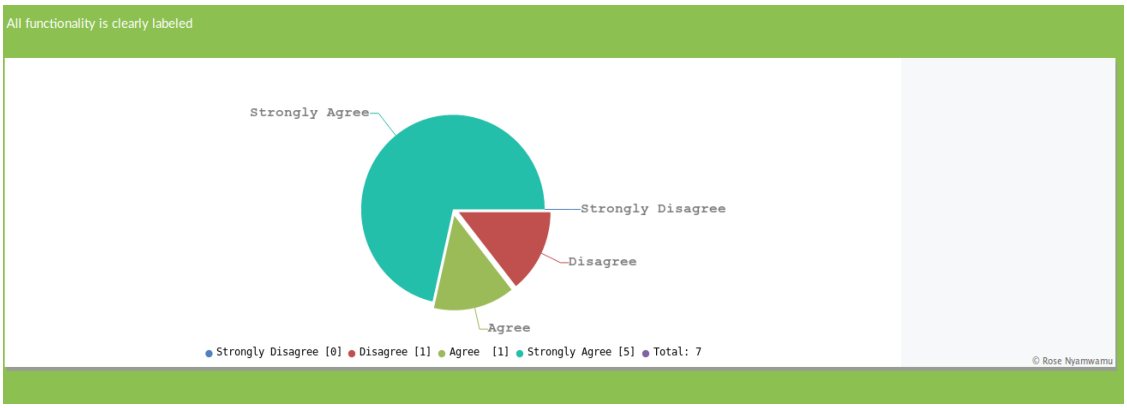


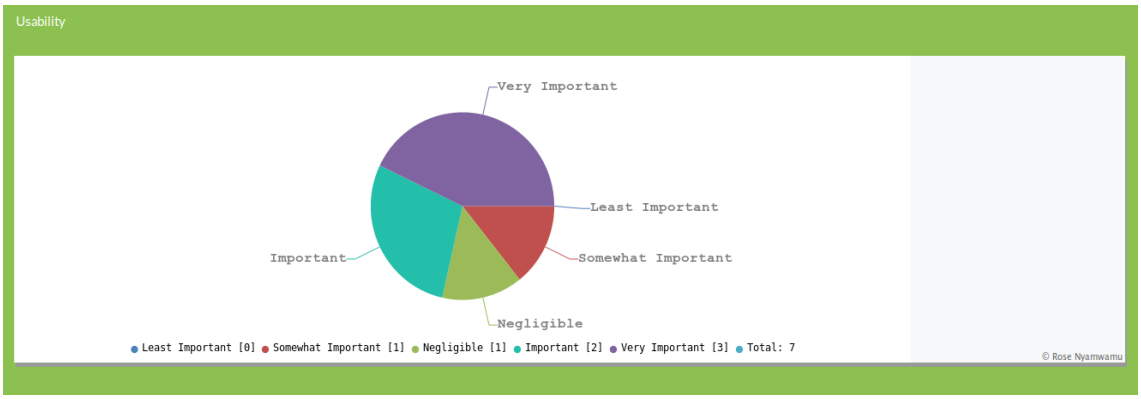


C) Combined Pie

This allows the Administrator to get the comprehensive user responses.







D) Text Based Answer Responses

In your own opinions what improvements would you want to see on the university website?

more graphics

none

More data organization, browser uniformity and regular updating.

Sthwefewf

A more dynamic portal for users/students.

better photos

none

In your opinion is there any other attribute(parameters) that you think should be considered in evaluating the institutions website?

none

none

N/A

Sthewfew

Not really

improvement on what is available

none

Are there any services that you would wish was offered by the website?

more reliability

none

Student - teacher relations and current class based evaluation

Sthfewfew

Yes; basic student affairs, notifications and communications panel

more interactivity

none