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Government Websites Usability and User Experience in Kenya

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**Submitted in Partial Fulfillment of the Requirements for Master of Science
Degree in Information Systems**

August, 2013

Declaration

I certify that this is my original work and has not been submitted for any academic award in any other university.

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This project has been submitted for Examination with my approval as the supervisor.

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Acknowledgements

I would like to acknowledge my supervisor Samuel Ruhui, for his encouragement, guidance and support through out the study. I would also like to acknowledge Academixed Technologies and Africa Nazarene University for their support in providing venue and participation certificates. God bless you all.

Abstract

With the increased internet use, citizens demand more e-services in paying bills, paying taxes, among others. Governments are striving to provide e-services to their citizens from a customer demand driven perspective as opposed to supplier oriented (UN e-Government survey, 2012). There is therefore the need for Kenya to enhance its e-services provision channels which are websites and portals. This research study evaluated the usability and user experiences in Kenyan government websites. It focused on the challenges that users faces in interacting with the websites through lab-based usability testing followed by a simple post-test survey and a debriefing interview.

The study revealed that the Kenyan government websites had low usability rating and the usability issues were at basic website design level, like the font size, text-to-background contrast, broken links, self-pointing links on pages, among others. The findings also revealed that the contents of government websites were not constantly updated and their way of handling personal details compromised individual privacy. It further revealed that user experiences were poor and most users only revisit the sites as an obligation or lack of a better option.

Guidelines and standards for government websites need to be established to minimize usability issues and improve on user experiences.

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Acronyms

CHI – Computer Human Interaction

HCI – Human Computer Interaction

ICT – Information Communication Technology

KeNIC - Kenya Network Information Centre

PSSUQ - Post Study System Usability Questionnaire

QUIM - Quality In Use Integrated Measurement

ROI – Return on Investment

SANe – Skill Acquisition Network

SUM – Single Usability Metrics

SUMI – Software Usability Measurement Inventory

SUPR-Q – Standardized Universal Percentile Rank - Questionnaire

SUS – Software Usability Scale

UCD – User Centered Design

UX – User Experience

ICANN - Internet Corporation for Assigned Names and Numbers

GITS - Government Information Technology services

MUSiC - Metrics of Usability standards in Computing

Definition of Terms

Usefulness concerns the degree to which a product enables a user to achieve his or her goals, and may be argued to be the assessment of user's willingness to use the product at all.

Efficiency is the swiftness with which the user accomplishes his or her goal accurately and completely and it is usually a measure of time.

Effectiveness concerns the ease with which users can use a product to do what they intend and it is usually measured quantitatively with error rate.

Learnability can be treated as part of effectiveness and assesses the ability of users to relearn the system after periods of inactivity.

Satisfaction refers to the user's perceptions, feelings and opinions of the product.

Accessibility is generally about the aspects that make a product usable to people with disabilities or situational or temporary limitations like injury.

CHAPTER ONE

INTRODUCTION

1.0 Background

Usability of a product is the extent to which it can be used by specified user to achieve a specified goal effectively, efficiently and with satisfaction in a specified context of use (ISO, 1998). Nielsen & Loranger (2006) defined usability as an attribute of quality that refers to the swiftness with which users learn to use something, the attained efficiency while making use of it, how easy it is for them to remember how to use it, how error-prone it is and the level of satisfaction attained from using it. There should be no frustration in using a usable product (Rubin & Chisnell, 2008). Cappel & Huang (2007), states that for a web to be usable, it should be clear, simple, consistent and easy for users to use.

Governments are striving to implement e-government portals and websites (UN Global E-Government Survey, 2003). In Kenya, huge investments in Information Communication Technology (ICT) have been made, to increase accessibility, efficiency and effectiveness of e-services. The primary focus of e-governments has been the provision of service from a supplier perspective, but this is changing towards a more consumer demand driven policy and greater emphasis is on citizen usage (UN Global E-Government Survey, 2012). During the 1999 Conference of Human Factors in Computing (CHI 99), participants posed some questions, among them the following;

- What are the limiting factors to the success of interactive systems?
- How can we enable users to overcome those limits?

What is needed are methods and techniques to help designers change the way they view and design products – methods that work from the end user’s need and abilities to the eventual implementation of the product is user-centered design (UCD) (Rubin & Chisnell, 2008).

User-Centered Design (UCD) consists of the methods, procedures, processes, and techniques for designing usable products and systems, placing the user at the center of the whole process (Preece, 1994). User experience includes issues such as usefulness, desirability, credibility, accessibility and usability. Product designers strive to ensure that user experience in the process of product usage is improved to desirable levels. This study investigates the usability aspects and user experiences in government websites in Kenya.

1.1 Research Problem

Due to the low government websites usage according to UN Global E-Government Survey (2012), this study assesses the usability and user experience in using government websites in Kenya. The low use of government websites has previously been attributed to low computer to citizen ratio, high computer illiteracy levels, among others but lately the computer to citizen ratio and illiteracy levels have tremendously improved with no significant effect. The usability and user experiences have not been given attention as one of the factors that may be causing low usage of government websites. This research evaluates the usability and user experiences of government websites in Kenya. The research question for this study has been: How usable are government websites in Kenya and what are the experiences of users?

1.2 Purpose of the Study

The purpose of this study is to present a clear picture of the current usability status and user experiences in using government websites. It assessed whether the websites meet the user’s

expectations, how and why so. The study conducted website usability testing through observation of users as they used the websites to accomplish certain predetermined tasks in a testing room. This was followed by a debriefing interview and a post-test survey. The findings of this study will assist government website developers and administrators in increasing usability and improve users' experience in using the websites, which will probably increase the frequency of client visits to the websites. This is vital for efficient and effective public service delivery and increased citizen participation and inclusion in e-governance.

1.3 Objective of the Study

The main objective of this study was to evaluate the government websites usability and user experience in Kenya and present a clear picture of the current situation. To attain the overall objective, the study seeks to attain the following objectives:

- a) Evaluate the efficiency, learn-ability, memorability, robustness, and user satisfaction of the website
- b) Identify the weaknesses of government websites in terms of usability and user experience
- c) Present a clear picture of the usability and user experiences in government websites.

1.4 Research Questions

To achieve the above objectives, the study seeks to answer the following questions:

- a. What is the usability of government websites in Kenya?
- b. What is the experience of users of government websites in Kenya?

1.5 Justification

Citizens nowadays demand more e-information, e-services, e-application, the ease of paying fees and bills over the Internet, greater accountability and transparency, and greater citizen engagement and inclusion. To keep up with these demands countries must continue to improve their national and ministry portals and websites (UN Global E-Government Survey, 2008). There was therefore an urgent need to study the factors that affect the use of government websites, and more so the usability and user experience, which has received less attention previously. There is the need to move from the supplier perspective of service delivery to a consumer demand driven policy (UN Global E-Government Survey, 2012), for effective, efficient and easy to use government websites.

1.6 Limitation

Participants may improve an aspect of their behavior being experimentally measured simply in response to the fact that they are being studied and not in response to any particular experimental manipulation (Miller, 2010). This Hawthorne effect may have affected the results of this study slightly by improving the performance from actual conditions on the ground. In addition, the fact that Lab-testing limits testing locations to a few, also limited the sample of test participants' geographical coverage.

1.7 Scope of the Study

The study focused only on the usability and user experience of government websites in Kenya. Due to the high number of these websites (288 websites), the websites were first categorized into eleven representative groups (Acts of Kenya, 2010). The Kenyan e-government website was also added to the list to make a sample of twelve government websites.

1.8 Assumptions

The study took the assumptions that;

- Through out the research study period the websites under investigation would not change in design significantly.
- The sample websites under investigation would be a good representation of the population.

1.9 Significance of the Study

This study will assist in maximizing the effectiveness and efficiency of the government websites and consequently increasing their cost-effectiveness in e-government service delivery. The findings of this study will also play a great role in improving government websites usability and hence increase their usage through elimination or minimization of user frustrations. This will increase e-participation and e-inclusion for democratic governance.

It will also diversify and widen the study of e-inclusion and e-participation from the perspective of usability of the channels of democratic e-governance. Finally, the study will elicit interest in research studies focusing on usability of various systems and products in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Human Computer Interaction

Human computer interaction (HCI) or Computer human interaction (CHI) is about designing computer systems that will help users perform their tasks productively and safely. It is a discipline concerned with the design, evaluation and implementation of interactive computer systems for human use and with the study of major phenomena surrounding them (Preece, 1994). It is important to design usable products that support the needs, knowledge and skills of the intended users.

The goal of human computer interaction is to develop and improve the safety, utility and effectiveness of systems, often through improving usability. To achieve these goals designers must both understand how users operate the systems and design techniques that support ease of use in those contexts. Therefore human computer design is simply designing computer systems for the people and not vice versa (Preece, 1994). This will require deeper understanding of human behavior and mental processes, influence of one individual on a group's attitude and behavior, and ergonomics or how people interact with different artifacts. Software engineering provides a means of understanding the structure of the design process, and that process can be assessed for its effectiveness in interactive system design.

Human-Computer Interaction seeks to understand the constraints and paradigms that describe how people use technology. Cognitive science provides detailed knowledge of how people recognize, comprehend, and remember information; HCI applies this knowledge in predicting how users will react to interfaces, and how those interfaces can be optimized. HCI basic

principles have a major impact on usability, and a thorough grounding in these concepts will help designers address unique interface problems from an informed perspective.

2.2 User-Centered Design (UCD)

User-Centered design (UCD) describes an approach that represents the techniques, processes, methods, and procedures for designing usable products and the systems while placing the user at the center of the process. Some terminologies used to mean UCD include Human Factors Engineering, Ergonomics, and Usability Engineering. UCD seeks to design products that support how end users actually work, rather than forcing users to adapt to the way the product is working. According to ISO 13407, UCD is characterized by actively involving and clearly understanding users and task requirements, allocating functions between users and technology appropriately, the iteration of design solutions, and multidisciplinary design. Usability testing is one of the techniques for helping ensure user-centered design. The basic principles of user-centered design include:

- Early focus on users and their tasks
- Evaluation and measurement of product usage
- Iterated design

A systematic, structured approach to the collection of information from and about users is required early in the development stages. A direct contact between end users and the design team through out the development life cycle will ensure a better understanding of users and tasks and better designs. Behavioural measurements of ease of learning and ease of use should be undertaken through out the design process, development and prototypes tested with end users.

2.3 Usability and User Experience

Different researchers have given various definitions of 'usability', which vary in inclusion of some terms and contexts but revolve around improving interaction between systems and their users. ISO (1998) defines usability of a product as the extent to which it can be used by specified user to achieve a specified goal effectively, efficiently and with satisfaction in a specified context of use (ISO 1998). Nielsen & Loranger (2006) argued that usability is an attribute of quality that refers to the swiftness with which users learn to use something, the attained efficiency while making use of it, how easy it is for them to remember how to use it, how error-prone it is and the level of satisfaction attained from using it. Rubin & Chisnell, (2008) defined usability as the absence of frustration in using a product while Cappel & Huang (2007) argues that a usable website should be clear, simple, consistent and easy for users to use.

The role of User Experience (UX) is to make the products more user-responsive and designed in such a way to satisfy users during their use in an effective and efficient manner. While User Experience seems omnipresent in the industry, a closer look shows that it is mainly treated like just usability and user-centered-design (Rubin & Chisnell, 2008). Researchers have however emphasized the differences between traditional usability and User Experience. ISO 9241 defines UX as all aspects of the user's experience when interacting with the product, service, environment or facility. It clarifies further that UX includes all aspects of usability and desirability of a product, system or service from the user's perspective.

2.4 Methods for Studying Usability and User Experience

The usability of a website can generally be evaluated using two broad categories of common methods and techniques, the inspection based methods where end users are not involved and the test based methods which involve the end users (Holzinger, 2005).

2.4.1 Ethnographic Study

This involves observation of users in places where they normally use the product to collect data about the targeted users, their expectations on the planned product and the environment (context) in which they work to accomplish their goals (Rubin & Chisnell, 2008). It may involve development of user profiles, personas, scenarios, and task descriptions on which design team bases their decisions during the system development life cycle. It is therefore supposed to be taken at the initial stages of the development life cycle.

2.4.2 Participatory Design

It is often used in the development of in-house systems and places the end-user at the centre of the system development. It employs one or more representative user and uses him to understanding the target users' reactions to the design. The major problem is that the user may become too close to the design team hence withhold criticism, react or even think like a member of the design team. This can be corrected by the variation of participatory design, where a short workshop is arranged to have users, designers and developers working together on a certain aspect of design.

2.4.3 Focus Group Study

This involves use of a group of representative users in the early stages of system development to evaluate initial concepts. It employs simultaneous involvement of more than one participant. The

main objective is to determine how acceptable the concepts are, why they are not acceptable and what can be corrected to make the concepts acceptable and useful.

This method is good for general qualitative information but not the best method for evaluating performance and real behaviours.

2.4.4 Surveys

Surveys can be used at any time in the system development life cycle. It uses a larger sample to generalize to an entire population. It is required that survey should use a simple and clear language in collecting data from the sample. This is mostly done through interviews and questionnaires.

2.4.5 Walk-Through

Walk-through is used to discover how a user might perform with a product by imagining the user's route through an early prototype of the system. This method applies only after you have a clear idea of your target users and the tasks or goals they have. The designer plays the role of the user and guides his team mates, while the other team members record difficulties encountered and other issues that may concern the team members.

2.4.6 Card Sorting

It mainly focuses on content organization, vocabulary use and labeling in the user interface. The participants may be issued with cards showing content and then requested to assign a title or category to the content (open card sort) or may be issued with a list of categories and contents/functions then asked to assign contents/functions under each category.

2.4.7 Paper Prototyping

This involves use of papers to model or demonstrate the intended flow of web pages or interface functions. The participant comments about the navigation especially from low level to top levels.

Through this method, critical information can be collected fast and cheaply. The designer can identify the functions and features that are instinctive and those that are not, before committing himself to the coding process.

2.4.8 Expert (Heuristic) Evaluations

The experts' knowledge is used to judge the usability of the website through identification of usability problems and seeking to improve the usability of interface design by checking it against established standards. A good example is the use of the Ten Heuristics developed by Nielsen (1994).

2.4.9 Usability Testing

Usability testing employs techniques to collect empirical data while observing representative users using the system to accomplish their representative (real) tasks. It is mainly intended to expose usability deficiencies and improve on the weak areas.

To recruit a representative participant/user Nielsen (2000(a)) suggests that the researcher need to identify and develop a user profile categorizing shared characteristics of current users, as well as those that would influence the user's use of the website. A recruiting screener is then created from the profile to select participants. Krug (2010) argues that 3 to 5 participants are enough to uncover 70% to 80% of the problems. The study used five representative users as proposed by Nielsen (2000(b)) and focused more on qualitative data (Nielsen, 2012). The minimal quantitative data collected during the study was to show the gravity of the qualitative results (Krug, 2010). This was also supported by Nielsen (2012) who suggested that for quantitative data to gain statistical meaning one has to collect data from a statistically significant number of users (at least 20 users).

Each user was given three tasks to attempt (Rubin & Chisnell, 2008) on the website and requested to ‘think aloud’ as he/she attempted them. The task selected for testing should be something users would seek to do with the website (Nielsen, 2012), should include basic tasks that users perform frequently and that would probe possible problems. The users are encouraged to think aloud as they interact with the website while at the same time they are observed. User statement cannot always be taken at face value, as data about people’s actual behaviour should have precedence over people’s claims of what they think they do (Nielsen, 2012). There is therefore the need to analyze body language, facial expressions and cursor movement as the user performs task as it can give relatively more accurate information. This study focuses on usability testing supported by short post-testing survey and a debriefing interview.

Krug (2010) argued that one of the major advantages of observing users doing their own task is that one often finds that they use the software in unexpected ways that one would not have sought to test in a heuristic evaluation.

2.4.10 Follow-Up Studies

Follow-up studies are carried out after the formal release of the system or product. Its main purpose is to collect data for the next release based on the performance of the current release. It usually uses surveys, interviews, and observations.

All these and other research methods used in the field of usability and user experience differ along three dimensions (Rohrer, 2008). These dimensions, Attitudinal vs. Behavioral, Qualitative vs. Quantitative, and Context of Website or Product Use are well illustrated in *Figure 1*. In the illustration, each dimension provides a way of distinguishing between studies in terms of the questions they seek to answer and the purposes for which they are best suited. As you move

along the vertical axis, studies test from attitudes to behaviour of the user, and as you move along the horizontal axis, studies test from qualitative data to quantitative data.

Rohrer also mapped the questions that user experience research methods answer on the basis of Data Source and Approach as on *Figure 2*.

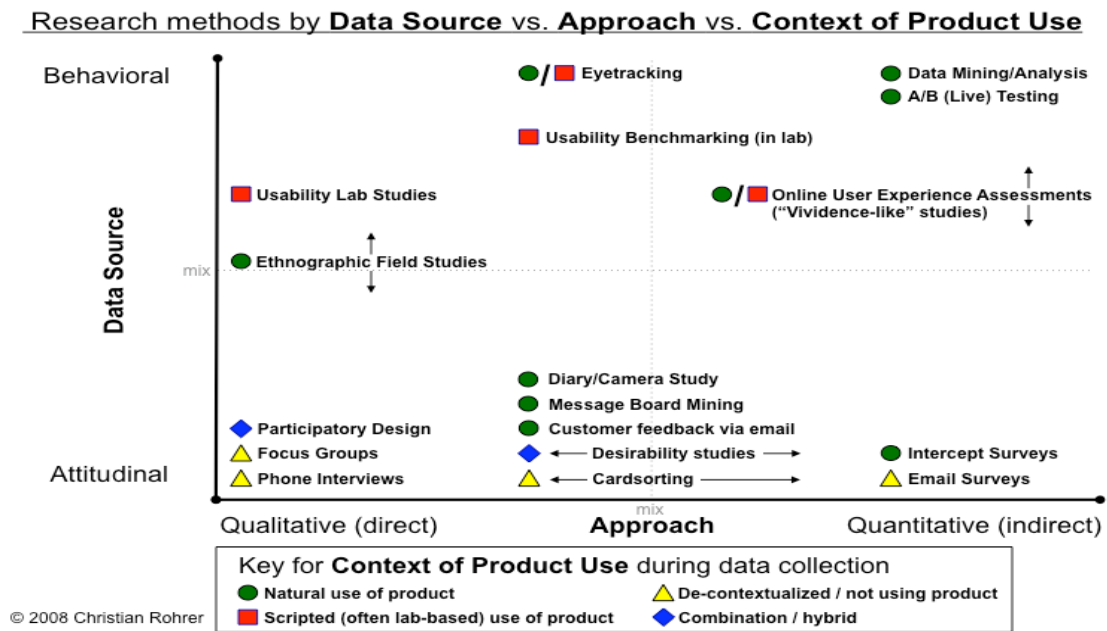
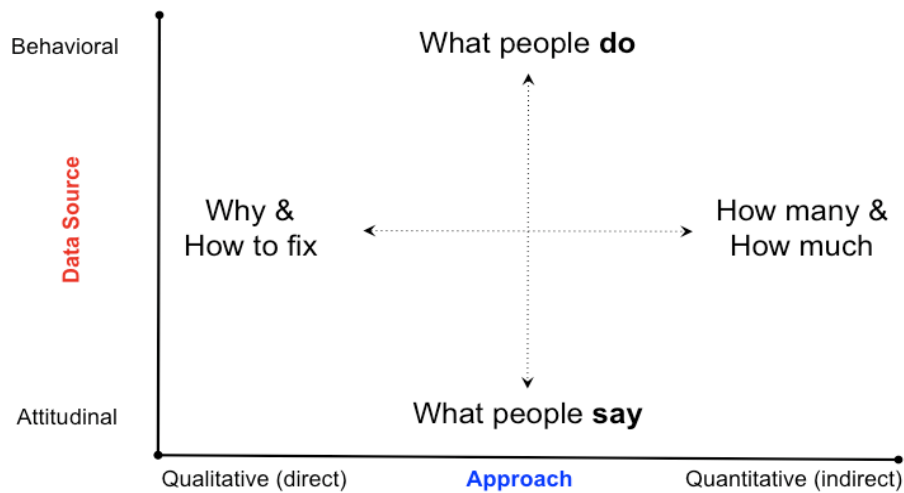


Figure 1: User Experience Research Methods Dimensions (Rohrer, 2008).

The main difference between qualitative studies and quantitative studies is that in qualitative, data is collected directly and they seek to answer 'why' and 'how' questions, while in quantitative data is collected indirectly to answer 'how much' and 'how many' questions. In usability studies, the researcher may observe the end users as they meet their needs through the website. Qualitative analysis of data is usually not mathematical but in quantitative methods mathematics is used in data analysis especially because data is in huge coded numerical figures.

Questions answered by research methods based on **Data Source** & **Approach**



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Figure 2: Research Methods Categorization (Rohrer, 2008).

2.5 Usability Metrics

The ISO 9241-11 (1998) identified efficiency, effectiveness, and satisfaction as the main aspects of usability. This standard does not give guidelines on how to interpret scores from specific usability metrics. Usability has also been defined as a software quality attribute that can be decomposed into five different factors, including understandability, learn-ability, operability, attractiveness and usability compliance with published style guides or conventions for user interfaces (ISO/IEC 9126, 2001).

ISO/IEC 9126 (2001) argued that 'quality of use' is a higher-order software quality attribute that can be decomposed into effectiveness (also usefulness), productivity, and safety. It posits that the difference between quality in use and usability is a matter of context, and classifies metrics in terms of levels of measurement (i.e. nominal, ordinal, interval, or ratio) and measurement type (i.e elapsed time, size, number of times an event occurs). Macleod (1994(cited in Macleod et al.

(1997)) developed the Skill Acquisition Network (SANE) model to analyze the quality of use in interactive devices. He described sixty different metrics, 24 of which concerned quality measures, and the scores could then be combined to form five composite quality measures;

- Efficiency which was determined by the estimated costs in terms of total time in executing user procedures
- Learning, which was determined by the number of state transitions and states needed to perform the user tasks,
- Adaptive – functionality of the device within a specified application domain
- Cognitive workload – controllability of the application, decision complexity and memory load
- Effort for error correction – robustness of a device and the costs for error recovery

We rely on the negative and positive usability impacts to assess the quality of the user experience. Some of the metrics according to Sauro (2011) used in evaluating usability include:

- Task Completion Rates – Also termed as fundamental usability metric and it is a binary metric, where a 1 represents a Task Success and 0 represents a Task Failure. It capitalizes on the user's ability to accomplish his or her goals.
- Usability Problems (User Interface Problems) encountered. It involves describing the problem, the number of users encountering it, and which users. It may also include severity of the problems but not always. It is a key metric of measuring the Return on Investment (ROI) and usability activity impact especially when it can clearly show the probability of users encountering a problem.

- Task Time – it records how long, in seconds or minutes, a user takes to complete a task. The total duration of a task is the *defacto* measure of efficiency and productivity.
- Task Level Satisfaction – it highlights a difficult task especially when compared to a database of other tasks. It involves having the users to answer a few questions about the difficulty of a task after attempting the task.
- Test Level Satisfaction – this is well captured through the use of SUPR-Q for websites and Software Usability Scale (SUS) for general software and hardware. It involves a usability test followed by questions to participants about their impression of the overall ease of use.
- Errors – this involves recording any unintended action, slip, mistake or omission a user makes while attempting to perform a task. Each error instance is well described to easily provide classification and severity rating. They usually require moderator to collect and hence are expensive in terms of time and money.
- Expectations – Based on some subtle clues in the task-scenario, users have some expectations about the difficulty a task should have. This can easily be collected through asking users how difficult they expect a task to be and then compare these expectations with actual task difficulty rating.
- Page Views/Clicks – This is an analysis on the number of clicks made by the user during the interaction with the website.
- Single Usability Metrics (SUM) – this is a standardized average of the measures of effectiveness, efficiency and satisfaction. It is composed of completion rates, task level satisfaction and task time.

2.6 Comparing Subjective and Objective Usability Metrics

Nielsen (2012) took a test on 298 web designs and suggests that there is a strong correlation between subjective and objective usability metrics. The results are well represented on Figure 3 where each dot represents a website, intranet or an application. The x -axis indicates how well users performed with that design on the objective performance metrics, such as speed or error rates. After recording raw numbers to a uniform system which would allow them compare very different classes, alternative designs were compared to calculate the standard deviations each system scored relative to the mean of its peers. Bigger scores in the chart represent better usability. For instance, smaller numbers are better when dealing with user error rates, so one standard deviation below the mean error rate is shown as a score of +1.

The y -axis indicates users' favorability rating to each design on the subjective satisfaction survey. To make this metric comparable with the x -axis, raw scores were converted into standard-deviation scores. The superiority of user rating on design, which are represented by dots, increase from left to right along the x – axis, where the y - axis represents the mean. Correspondingly, satisfaction rating along the y – axis improves from bottom to top. Those dots below the x – axis represent designs that users rated worse than the mean.

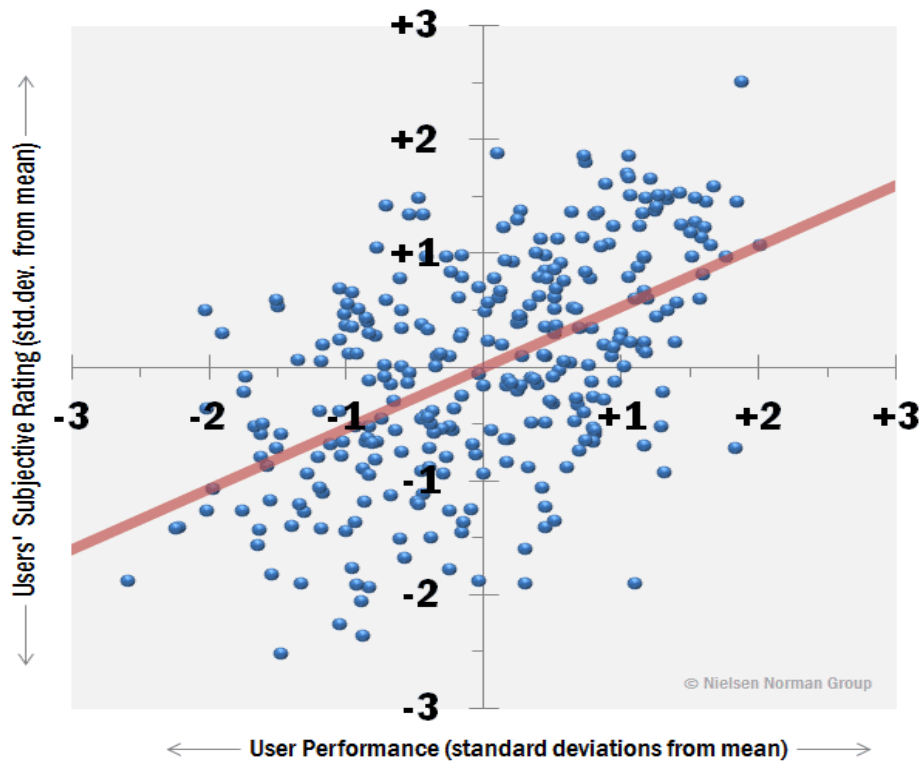


Figure 3: Subjective and Objective usability metrics Comparison (Nielsen, 2012)

He concluded that performance and user preference had strong correlation of 0.53. To collect objective performance metrics, the researcher need to ask users to perform representative tasks and record the time used to perform them and whether they can do it at all.

2.7 Usability Attributes

There are varying definitions across different sets of standards or authors concerning the aspects of usability. As shown in *Table 1*, some aspects are common among some definitions / models where not all definitions share the same core set of usability aspects.

Shackel (1991)	Schneiderman (1992)	Nielsen (1993)	Preece et al. (1994)	ISO 9241-11 (1998)	Constantine & Lockwood (1999)
Effectiveness (speed)	Speed of performance	Effeciency of use	Throughput	Efficiency	Efficiency in use
Learnability (Time to learn)	Time to learn	Learnability (Ease of learning)	Learnability (Ease of learning)		Learnability
Learnability (Retention)	Retention over time	Memorability			Rememberability
Effectiveness (Errors)	Rate of errors by users	Errors / safety	Throughput		Reliability in use
Attitude	Subjective satisfaction	Satisfaction	Attitude	Satisfaction (Comfort and acceptability of use)	User satisfaction

Table 1: Usability aspects of various standards / models

2.8 Usability Models

Hix and Hartson (1993) looked at usability as a combination of performance, learnability, retainability, advanced feature usage, first impression, and long-term user satisfaction. Usability is a result of relevance, efficiency, learnability and attitude (Lowgren, 1993(cited in Sauro & Lewis (2012))). Porteous et al. (1993(cited in Macleod et al. (1997))) developed Software Usability Measurement Inventory (SUMI), which describes usability using attributes like efficiency, effectiveness, helpfulness, control and learnability. This was followed by the introduction of Post Study System Usability Questionnaire (PSSUQ), which categorized usability into system usefulness, information quality, and interface quality (Lewis, (1995) cited

in Kumar & Rana (2010)) while Dix et al. (1998) argues that the categories should be learnability, flexibility and robustness.

Donyaee et al. ((2001) cited in Kumar & Rana (2010)) developed Quality in Use Integrated Measurement (QUIM) model which consisted of effectiveness, efficiency, satisfaction, productivity, safety, internationality and accessibility. In 2002, Brinck et al. (cited in Krug (2010)) argued that usability consisted of correct functionality, efficient to use, easy to learn, easy to remember, error tolerant, and subjectively pleasing. Bass et al (2003(cited in Krug (2010)) posits that usable systems have qualities like performance, scalability, modifiability, reusability and security. The five usability measures according to Shneiderman et al (2005) are time to learn, speed of performance, rate of errors by users, retention over time, and subjective satisfaction. Campbell et al. (2003(cited in Rubin & Chisnell (2008)) has stated that usability refers to the relationships between tools and their users, while Krug (2010) looked at it from the user's perspective with the need for an intuitive experience.

Nielsen (2012) defines usability as a quality attribute that assess how easy user interfaces are to use. He argued that during the design process, the term usability suggests improving ease-of-use. He outlines five quality components that define usability; learnability, efficiency, memorability, error frequency and recovery and satisfaction. Nielsen recognizes the presence of other quality attributes which are within usability and sites one as the design's ability to do what the users need – utility. Nielsen (2012) posits that out of the many methods for studying usability, the most basic and useful is User Testing. This involves three steps of selecting respective users, asking them to perform respective tasks with the design and then observe them as they do so. Users are encouraged to talk or think aloud.

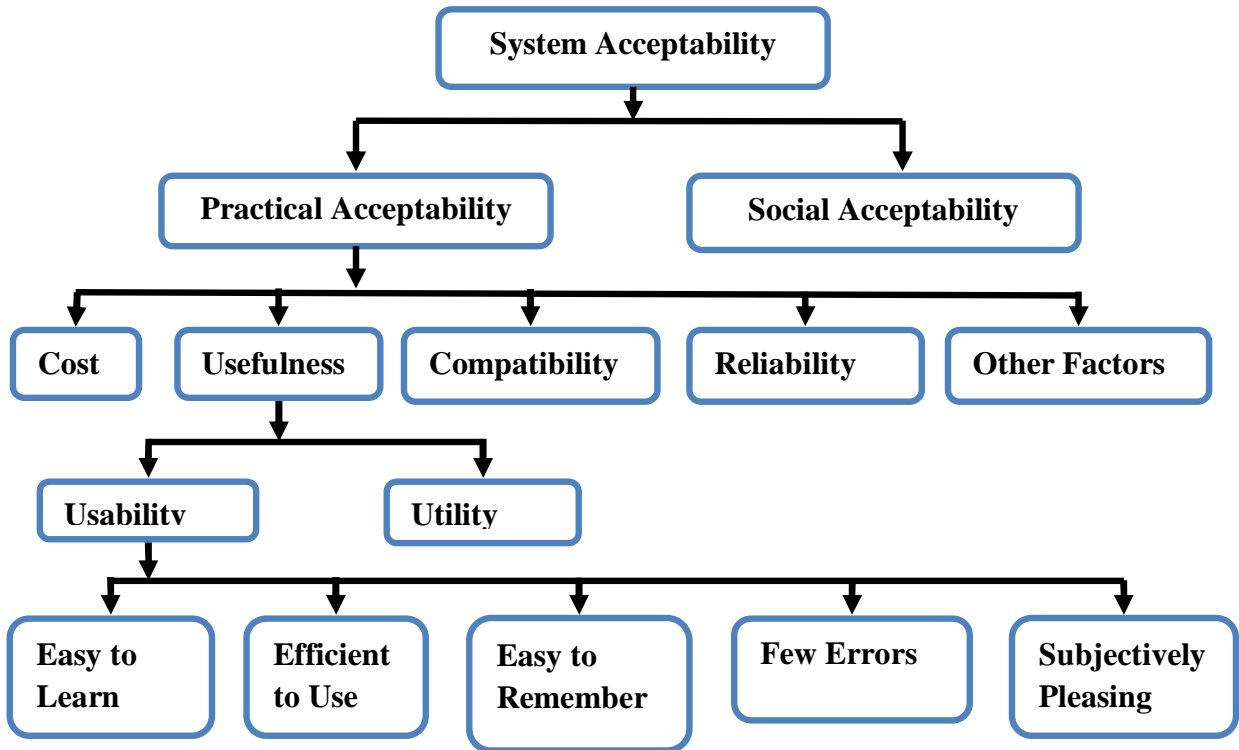


Figure 4: System Acceptability Model by Nielsen (1997)

In all these models, ‘User Satisfaction’ is treated as an imperative factor for a successful system. Since the system is intended for the end user, his satisfaction with its use will determine whether he will be eager to use it again or desperately look for a substitute. In this study, the main focus is on usability and user experience. User satisfaction depends on the experience (User Experience) he or she had with the system. This in turn depends on the usability of the system which is comprised of the Robustness, Memorability, Learn-ability, Efficiency, and Effectiveness of the system. Though some researchers argue that usability is an attribute of accessibility, while others argue that accessibility is an attribute of usability, it is evident that the two affect each other.

Robustness mainly is the focus on how the system reacts when it encounters an error, ease of recovery from the error and how prone it is to errors. Flexibility concerns the ability to adapt in different scenarios to meet diverse user needs. Learn-ability concerns the ease of user in becoming skilled at using the system. This may be measured by evaluating the Simplicity of the system, whether it is Self-descriptive, availability of User Guidance, the Number of Actions required to accomplish a task, and amount of information the user need to keep in his or her memory.

Efficiency is concerned with optimal resource utilization in terms of time used, finance, and the time taken to receive feedback. Memorability concerns the ability of a returning user to remember how to navigate through the site and accomplish their task.

2.9 Government Websites and E-Government

The term 'e-government' is usually adopted to denote web-based services provided by the government to its citizens, business organizations or other governments (Palvia & Sharma, 2007). According to UN Global E-Government Survey (2012), government websites implementation can be classified into four main stages, namely; (1) emerging presence, (2) interactive presence, (3) transactional presence and (4) networked presence. Emerging presence involve development of websites for provision of information only. In interactive presence the focus is mainly on platforms for unidirectional communication between the government and citizens, like the use of discussion forums. In transactional presence, emphasis is on development of web-based tools for facilitation of online transactions like e-voting, e-procurement, among others.

Finally, networked presence means the integration of government systems to share resources and provide services. In all these four stages, usability and user experience issues are very relevant, especially for the e-government to move upwards from emerging presence.

2.10 Kenyan E-Government Current Status

The Kenya Network Information Centre (KeNIC) is the organization that manages the Domain Name registration service for .KE domains under the delegated authority by the Internet Corporation for Assigned Names and Numbers (ICANN). It classifies .KE names space to accommodate different kinds of institutions and sectors of activities.

The .KE is divided into various domain levels which serve different functions. The domain .go.ke is reserved for Kenya government ministries and institutions, and requires supporting documents from the department of government IT services (GITS) at the Ministry of Finance. The GITS gives an Authority Letter to show that the entity is a valid government institution or Agency and authorized to register the domain name. Others are .co.ke for companies; .or.ke for Non-Profit making organizations and NGOs; .ne.ke for network devices; .ac.ke for institutions for higher learning; .sc.ke for lower and middle institutes of learning; .me.ke for personal names; and .mobi.ke for mobile content. This study focused on websites with .go.ke domain name.

According to the United Nations E-Government Survey (2012), Kenya is rated position 119 out of 193 UN members with its human capital index as 0.711 compared to the world average at 0.721 but its e-participation index is 0.053 compared to the world average at 0.268 (Figure 5).

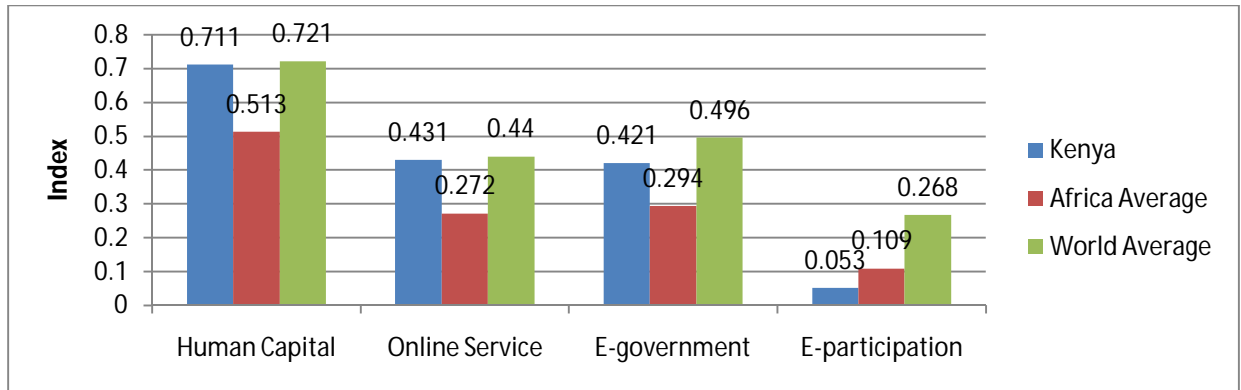


Figure 5: Kenya E-Government Rating (UNDESA e-Government Survey, 2012)

Despite the high human capital, the potential benefits that internet present to people, and the high number of government websites in Kenya, there has been a remarkably low citizen e-participation. It is important to note that the e-participation index of Kenya was rated as half the Africa average, and this may be as a result of the low government website usage.

Researchers previously have attributed the low usage of government websites and general internet use on the illiteracy levels, inaccessibility of computer hardware in terms of cost and availability of related services like electrification, among others. Currently, a high number of citizens especially youth are computer literate, the rate of computer importation is also relatively high compared to the past (World Bank, 2011) and internet access has also improved through internet-enabled mobile phones.

Currently, <http://www.e-government.go.ke> is claimed to be the official e-government website, but it does not allow citizens to accomplish tasks or access online services from any government ministry seamlessly. The site administrator acknowledges this fact and proposes an improved version of the site as <http://www.kenya.go.ke>. Without giving website usability the attention it deserves, or at least striving to improve it, changing the URL may not mean much to the users.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

There are a number of methods to carry out website usability studies (as discussed in Chapter 2). These methods differ in approach and data sources (*Figure 1*). The most effective usability study is Usability Testing, where end users are actively involved (Rubin & Chisnell, 2008) and data collected through direct observation since users may say how they think they do, which is not necessarily how they do (Nielsen, 1993). This study used lab-based usability testing, majorly qualitative research method, supplemented by minimal quantitative data to show the gravity of the qualitative results. A stratified random sample of twelve (12) websites and a purposively selected sample of five (5) test participants (Nielsen, 2012) for each website were used in this study. Each test participant was issued 3 tasks (Rubin & Chisnell, 2008) to accomplish using the website (*Appendix B*).

3.1 Usability Testing (Lab-Based Testing)

Website usability testing is the truest test of how people actually use the website. In this study, usability testing was used to test whether outsiders could successfully use the websites, and the experiences they have during the use. This involved:

- Identifying representative end users of the websites. This involved ensuring there novice users, experts, different ages and both genders were represented in the five participants.
- Giving the users representative tasks to attempt.
- Observing the users as they attempt the tasks.

The observer observed the user quietly without disruptions and recorded the observations. The screen, facial expressions, audio and body language were also recorded to enable review after the task completion. After the session, a post-test questionnaire was administered followed by a debriefing interview. For a successful usability test, the researcher sought to determine and understand the user profile of the website; what was to be tested; the metrics to measure and how to eliminate bias and avoid influencing user's judgments. A strict process was followed to ensure the set testing goals were achieved.

3.2 Testing Process

The process comprised of the following steps;

1. Developing the test plan
2. Setting up a testing environment
3. Recruiting participants
4. Preparing test materials
5. Conducting the test sessions
6. Debriefing the participants and observers
7. Analyzing data and observations
8. Report findings and recommendations

3.2.1 Developing the test Plan

The test plan is the foundation of the entire test and it acts as a blueprint for the test. It defines and implies required resources and ensures that the test follows a systematic procedure and helps in determining whether the research is on course or not. The contents of the test plan for this research study included:

- Purpose and objectives of the test
- Research questions
- Participant's profile
- Test design
- List of tasks (*See Appendix B*)
- Test environment, equipment and logistics
- Data to be collected and evaluation measures
- Report contents and presentation

After the identification of the sample websites, participants' profile (*Table 2*) and a list of tasks to be attempted per website were prepared (*Appendix B*).

3.2.1.1 Task Selection

In the determination of tasks to be attempted on the websites, the researcher took into consideration:

- The target users of the specific websites,
- Frequently performed tasks and would probe into possible problem areas of the site
- Tasks that would explore the components of the website design

The tasks were representative of general testability of the website and were presented in scenarios that added context to them, helping users feel as if it was a real life situation.

3.2.2 Setting up a Testing Environment

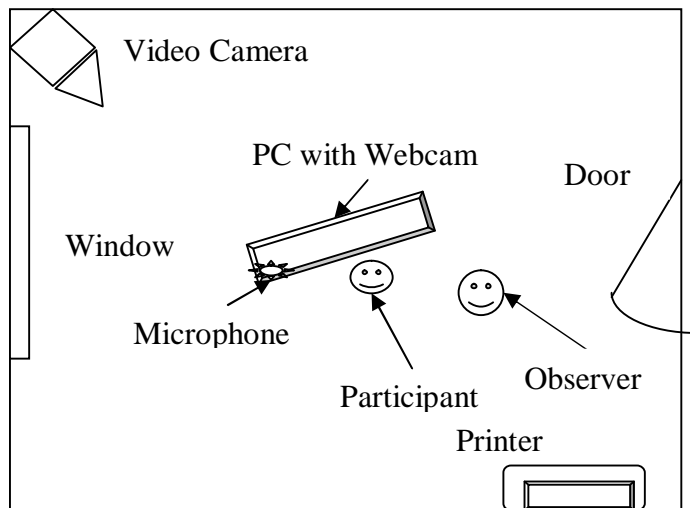


Figure 6: Testing Room Layout

The testing environment used was a simple room set up with one computer for the participant. A chair for the observer, a video camera was also mounted on one corner of the ceiling of the room to record body language. A printer connected to the computer was set up inside the room and a microphone mounted on the PC for audio recording. The door was kept locked and the lighting was made optimum depending on the participant's requests. The participant's computer specifications included;

- Processor Intel Pentium IV 2.0 GHz
- Memory (RAM) 2GB
- Sound Card Creative Labs Sound Blaster
- TFT Monitor 17"
- Webcam on the monitor to record facial expressions
- Microsoft XP operating System
- Mozilla Firefox version 17
- Microsoft office 2007
- Adobe (PDF 1.7) reader
- Debut Video Capture software to record cursor movement, clicks and participants voice

To eliminate the Hawthorne effect, users were informed that they were not the subject for the study and the observer kept a distance where the user would not feel uncomfortably monitored and most of the timing was captured from the Debut Video recordings.

3.2.3 Recruiting Participants

Five participants per website were needed for the usability testing (Nielsen, 2000). A detailed analysis of the websites, their targeted and frequent users was carried out, and a screening questionnaire (*Appendix C*) administered randomly to 200 people in Nairobi, Thika and Kiambu. This questionnaire assisted in categorizing the prospective test participants into groups according to gender; age; novice/expert users; employment status and internet experience, among others. This was done through user profiling (*Table 2*).

3.2.3.1 User Profiling

Out of the 200 screening questionnaires, only 159 respondents returned and out of this, only 121 respondents confirmed availability under the voluntary basis engagement. To attain the profile mix, successive categorization of respondents' information was done until 60 users shortlisted. Invitations for the testing and an introductory letter (*Appendix D*) were sent to the 60

respondents. A confirmation call was made to every participant and participants were scheduled according to their availability and convenience.

User Profile		No. of Participants												TOTAL	Percentage
		W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12		
Gender	Male	2	3	2	3	3	3	3	3	2	2	3	3	32	53
	Female	3	2	3	2	2	2	2	2	3	3	2	2	28	47
	Total	5	5	5	5	5	5	5	5	5	5	5	5	60	
Employment Status	Student	2	2	2	2	1	1	2	1	2	2	1	1	19	32
	Employed	1	1	1	1	1	2	1	1	1	1	2	1	14	23
	Retired	1	1	1	1	1	1	1	1	1	1	1	1	12	20
	Others	1	1	1	1	2	1	1	2	1	1	1	2	15	25
	Total	5	5	5	5	5	5	5	5	5	5	5	5	60	
Age (in Yrs)	18-35	3	2	2	2	2	1	2	2	2	2	1	1	22	37
	36-55	1	2	1	1	2	2	1	1	2	1	2	2	18	30
	Above 55	1	1	2	2	1	2	2	2	1	2	2	2	20	33
	Total	5	5	5	5	5	5	5	5	5	5	5	5	60	
Eye Sight (Need Lenses?)	No Lenses	3	4	4	2	3	2	3	3	2	4	3	3	36	60
	Moderate Prescription	2	1	1	2	2	3	2	1	3	1	2	1	21	35
	Heavy Prescription	0	0	0	1	0	0	0	1	0	0	0	1	3	5
	Total	5	5	5	5	5	5	5	5	5	5	5	5	60	
Internet Skills (Skilled)	Not at all	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Somewhat	1	2	1	2	1	1	1	1	2	2	2	1	17	28
	Moderate	2	2	2	2	2	2	2	2	1	2	1	2	22	37
	High	2	1	2	1	1	2	2	1	2	1	2	2	19	32
	Excellent	0	0	0	0	1	0	0	1	0	0	0	0	2	3
	Total	5	5	5	5	5	5	5	5	5	5	5	5	60	
Hours of Internet Use per Week	< 1 hour	0	1	1	0	1	1	0	1	1	1	2	1	10	17
	2-4 hours	2	1	1	1	1	2	2	1	1	1	1	2	16	27
	5-10 hours	1	2	1	2	2	1	2	1	1	2	1	1	17	28
	>10 hours	2	1	2	2	1	1	1	2	2	1	1	1	17	28

	Total	5	5	5	5	5	5	5	5	5	5	5	5	5	60	
No. of Times User has filled Online Forms	0	1	1	1	2	1	1	1	2	1	1	1	1	1	14	23
	1-2	2	2	1	1	1	2	1	1	2	2	2	2	2	19	32
	3-5	1	2	2	1	2	1	2	1	1	2	1	1	17	28	
	> 5	1	0	1	1	1	1	1	1	1	0	1	1	10	17	
	Total	5	5	5	5	5	5	5	5	5	5	5	5	5	60	

Table 2: User profiling

3.2.4 Test Material

Test materials included a note book, list of tasks (*Appendix B*), plain printing papers, Consent and Material release forms (*Appendix E*), post-test questionnaire (*Appendix F*) and a guide to the debriefing interview (*Appendix G*). The plain papers were for printing where necessary and the note book was used by the observer in noting observations.

3.2.5 Test Session

Before the actual testing started, each participant was briefed about the purpose of the test, procedures to be followed, his or her rights and potential related risks. Issues related to participant's privacy and informed consent were thoroughly discussed and ensured that the participant was not recorded without his/her knowledge and consent. The participants were requested to read and sign their consent form and material release form (*Appendix E*) before the test.

In the effort to set a relaxed atmosphere in the testing room, each participant was allowed to interact with the computer for 10 minutes. The participant was given a specific task to perform on the website and encouraged to 'think aloud'. After completion or abandonment of the task, a

second task was given and consecutively the third task. Each user performed three tasks on the website.

After the test session, a short close-end post-test questionnaire was administered. This was necessary before any discussion on the website to minimize biasing effects. A semi-structured debriefing interview (*Appendix G*) of 10 minutes followed and this helped the interviewer collect any follow-ups that need to be clarified in depth.

3.3 Data Collection Methods

3.3.1 Observation

This is the most commonly used method especially in studies relating to behavioural sciences (Kothari, 2004). The study involved observation of;

- Website loading time in terms of seconds and users' reactions and remarks as they waited for the site to open.
- Task success rate (1 for success and 0 for unsuccessful) and frustrations experiences
- Time taken to complete a task in seconds
- Number of errors made per task per website and how users recovered from the errors
- Users' delays (in seconds) before making the first step (click) in attempting a task
- Text-to-background contrast and how the user react to such incidents
- Users' observable reactions (facial, body language of audio responses)
- Any other relevant observation during the test

These observations were later analyzed according to frequencies, uniformity in occurrence, average and the maximum values especially in cases of maximum delay. Averages were

calculated for the website loading time, number of errors and task completion time. Frequencies of frustrating situations and delays before first step (click) were also analyzed. A general qualitative analysis of how users recovered from errors, frustrations, their remarks, facial expressions and other body language communications was done. All these analysis were later compared to identify problems and their relative severity.

3.3.2 Post-Test Questionnaire

The post-test questionnaire contained questions on the users' opinion on the website which supplemented the observations. After the test participant performs the tasks, this questionnaire was administered to collect data on user experience with the website (*see Appendix F*). Responses from this questionnaire formed the basis for the debriefing interview.

The questionnaire consisted of ten questions which were assumed to carry equal weight (*Appendix F*). Questions 1 and 2 focused on website loading time and ability to minimize the time taken to complete a task. Questions 3 and 4 dealt with ability to use minimum steps to accomplish task and simplicity of the website presentation. Questions 5 and 6 focused more on self-descriptiveness and navigability of the website. Ease of use and pleasure of using the website was captured by questions 7 and 8 while questions 9 and 10 focused on aesthetic value and possibility of the user returning to the site.

The central tendency of the responses from the questionnaire was analyzed and the results merged with the observation data analysis to arrive at a comprehensive conclusion.

3.3.3 Debriefing Interview

After the test, the test observer perused through the post-test questionnaire to check whether there was a response requiring follow-up and then conducted a semi-structured interview with the test participant to collect in depth data or information not captured by the post-test questionnaire. This was made as brief as possible to avoid over-tasking the participant resulting to bias effect.

3.4 Data Collected

The study used the metrics proposed by Sauro (2011) in evaluating usability to collect data plus other qualitative observations that the researcher found important in making the results meaningful. Some of the data collected were:

- Website loading time in seconds
- Task success rate
- Task completion time
- Number of errors made
- Number of clicks per task
- Consistency in terminology and design
- Users subjective satisfaction
- Participant's facial expressions, audio and other expressions and body languages
- Frustrations (cursor movement was noted)
- Among other

Success rate was categorized into two; successful completion without prompting for assistance and successful completion after being advised to think of an alternative route. The time used for particular tasks was recorded in seconds. Tracing the cursor movement and mouse clicks was used in determining navigation errors, how participants recovered from those errors and frustrating scenarios. Though ‘think aloud’ is not the natural way most people operate, it assisted in capturing some important information especially when we assess tone variation, tempo, among others. Through the post-test questionnaire, the participant's experience and attitude towards the website was also captured.

3.5 Sampling

Since the government websites with *.go.ke* in Kenya are 288 according to Kenya Network Information Centre (KeNIC), this study first purposively select websites with national audience. Municipal, town council and other websites with only regional representations were eliminated from the list. After visiting all of the remaining 128 websites, it was noted that 26 were either not accessible or not operating anymore and 19 institutions had more than one website. This reduced the list to 72 websites, which were purposively categorized into 11 major categories with respect to the functions of National Government as stipulated in Part 1 (Fourth Schedule, Article 185 (2), 186 (1) and 187 (2)). From each category, one website was picked randomly to make a total of 11 websites. The e-government website <http://www.e-government.go.ke> was also added to the list with the understanding that it concerned all the 11 categories.

3.6 Limitations of the Methodology

The data from participant testing may be affected by the fact that the participant was aware that he or she was being watched. The data may also be affected by the fact that users think they are

the subject tested and hence their failure frustrates, and may get discouraged to participate in the tests that follow. This was catered for by allowing the participant to interact with the computer and use an informal approach before the actual testing. The participant was informed that he or she was not the test subject but the website. Geographical coverage of participants was another limitation due to the finance and time that would be involved if participants were to be drawn from all over the country.

3.7 Ethical Considerations

This study ensured that participants comprehend the test procedures and their rights. Before testing begins, the purpose of the test, procedures to be followed, participant's free will and any potential risks to participant was thoroughly discussed. The study also considered issues related to participant's privacy and informed consent, and ensured participant was not recorded without his/her knowledge and consent.

Material so recorded was solely used for this research study, and no names were recorded in questionnaires. Participants were requested to sign Consent form and Material Release form before the test started.

CHAPTER FOUR:

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the user testing for website usability. Qualitative statistical analysis was used in analyzing the data collected supported by minimal quantitative analysis. The research study focused more on usability from the users' perspective and users' experience and hence the major part of the data collected was qualitative. The frequency, severity, mean and mode were used in analyzing observations and responses from respondents. This analysis is presented in two major sections. Section 1 consists of the respondent's profile. It descriptively analyzes the age, gender, internet skills, employment status, internet-use experience and eye sight of the respondents. Section 2 covers the discussions and analysis of the research study objectives.

4.2 Descriptive Statistical Analysis

4.2.1 Age of Respondents

Out of the sample of 60 users, 36.6% were between 18 and 35 years, 30% between 36 and 55 years, and 33.4% were above 55 years old.

Age (Yrs)	Frequency	Percentage	Cumulative Percentage
18 – 35	22	37%	37%
36 – 55	18	30%	67%
Above 55	20	33%	100%

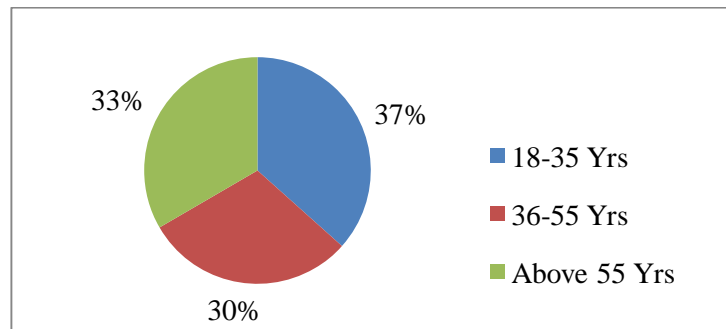


Figure 7: Age of Respondents

Table 3: Age of the Respondents

4.2.2 Gender of Respondents

Data was collected from a total sample of 60 respondents, 5 respondents for each website. The overall percentage representing female respondents was 46.6% and that representing male respondents was 53.4%. Male respondents were slightly more than their female counterparts due to their easy access after working hours.

Gender	Frequency	Percentage	Cumulative Percentage
Male	32	53%	53%
Female	28	47%	100%

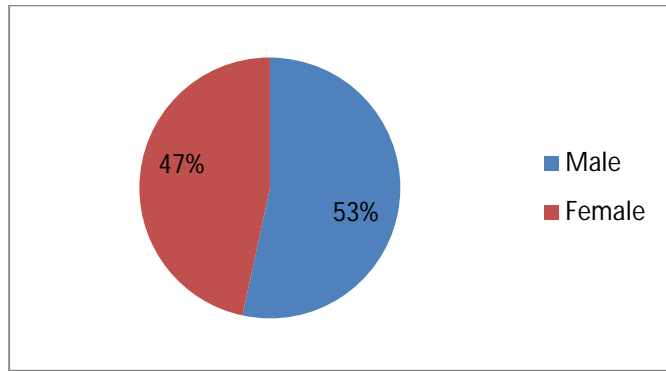


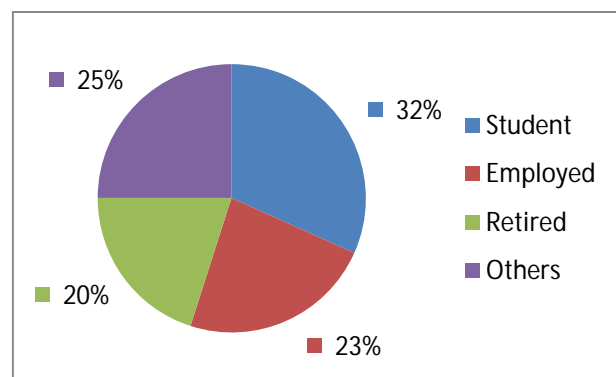
Figure 8: Gender of Respondents

Table 4: Gender of Respondents

4.2.3 Employment Status

From the sample used in testing, 31.6% were students 23.4% were formally employed, 10% were retired and 25% were in informal income generating activities.

Employment Status	Frequency	Percentage	Cumulative Percentage
Student	19	31.6%	31.6%
Employed	14	23.4%	65%
Retired	12	10%	75%



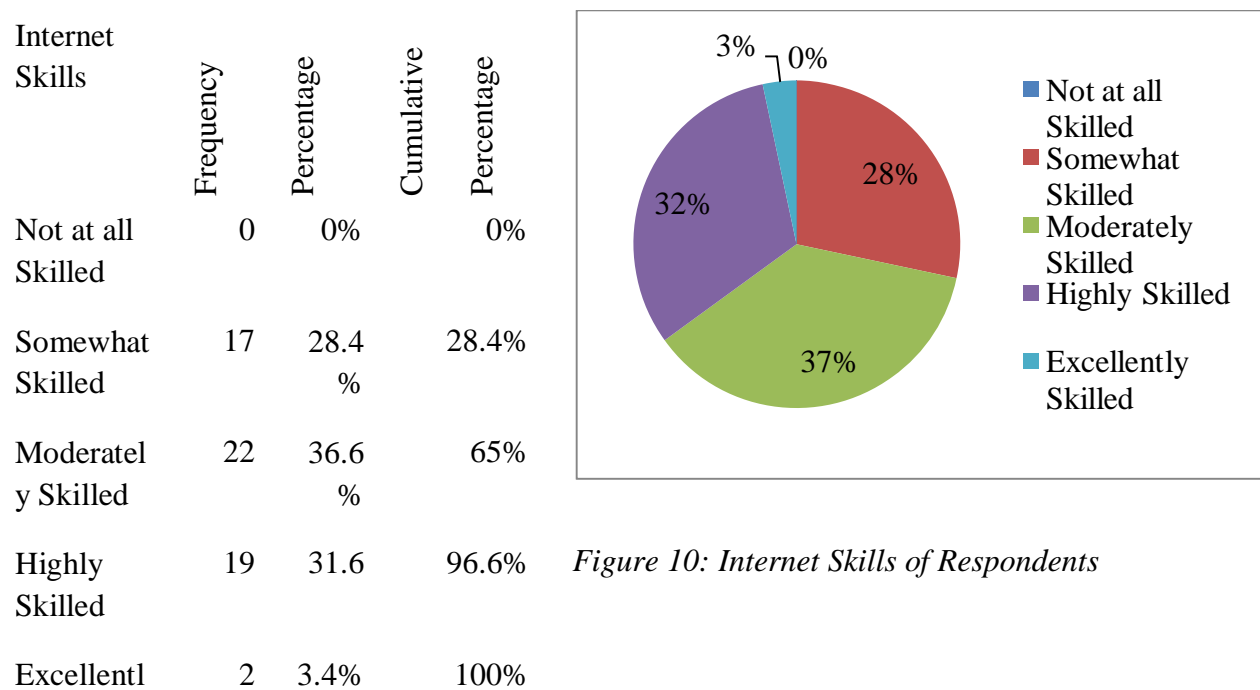
Others 15 25% 100%

Figure 9: Employment Status of Respondents

Table 5: Employment Status of Respondents

4.2.4 Internet Skills of Respondents

None of the users had no skills at all, 28.4% were a somewhat skilled, 36.6% were moderately skilled, 31.6% were highly skilled and only 3.4% were excellently skilled.



y Skilled

Table 6: Internet Skills of Respondents

4.2.5 Respondents' Eye Sight

Respondents were categorized into three groups depending on the quality of their visions and whether they needed lenses when using the websites. Out of the sample that participated in the testing, 60% had a perfect eye sight and needed no lenses, 35% used moderate-prescription lenses, and only 5% used heavy-prescription lenses.

Eye Sight (Vision)	Frequency	Percentage	Cumulative Percentage
Good Eye Sight	36	60%	60%
Moderate Prescription Lenses	21	35%	95%
Heavy Prescription Lenses	3	5%	100%

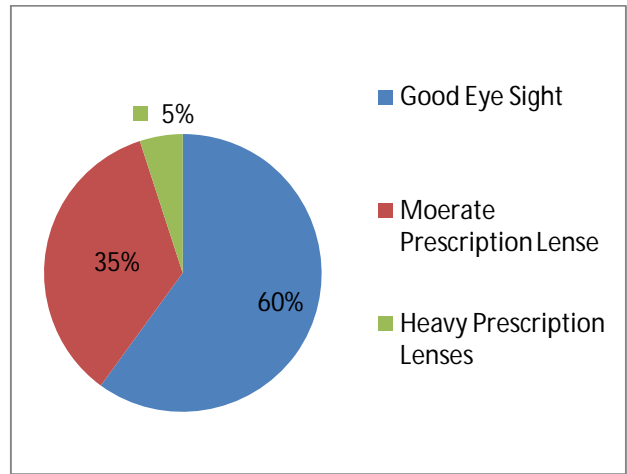


Figure 11: Respondents' Eye Sight

Table 7: Respondents' Eye Sight

4.2.6: Respondents' Internet Usage per Week

Those who used less than one hour on internet per week were 16.6%, those who use between 2 to 4 hours were 26.6%, those between 5 and 10 hours per week were 28.4% and the same percentage used more than 10 hours per week on internet.

Hours on Internet per Week	Frequency	Percentage	Cumulative Percentage
Less than 1 Hr	10	16.6%	16.6%
2 – 4 Hrs	16	26.6%	43.2%
5 – 10 Hrs	17	28.4%	71.6%
More than 10 Hrs	17	28.4%	100%

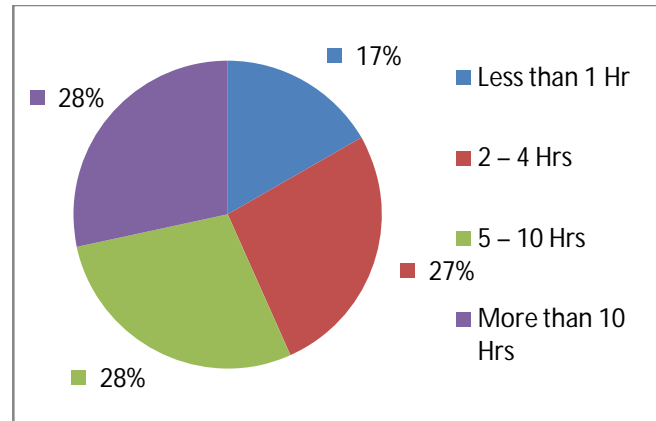


Figure 12: Respondents' Internet Use per Week

Table 8: Respondents' Internet Use per Week

4.2.7 Respondents Experience on Filling Online Forms

Only 23.4% of the sample users had not previously filled an online form, 31.6% had filled 1 or 2 online forms, 28.4% had filled between 3 and 5 online form and 16.6% had filled more than 5 online forms.

No. of Online Forms Filled	Frequency	Percentage	Cumulative Percentage
0	14	23.4%	23.4%
1 – 2	19	31.6%	55%
3 – 5	17	28.4%	83.4%
More than 5	10	16.6%	100%

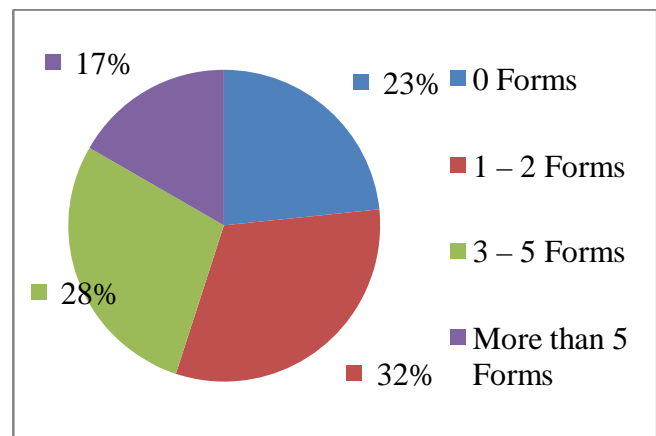


Figure 13: Respondents Experience on Filling Online Forms

Table 9: Respondents Experience on Filling Online Forms

4.3 Discussion on Website Usability Testing

This section presents the finding from the website usability testing carried out. Discussions have been done based on the observation data supported by the survey and debriefing interview responses per website. Section I presents the observations during the test sessions, section II discuss the survey results from the questionnaires and section III discuss issues rose during the debriefing interview.

4.3.1 Lab Test Observations

Website	Loading Time (sec)	% Success rate	Mean Errors	Percentage of users under each Observations
W1	7	87	2.2	<ul style="list-style-type: none"> • 80% expected the institution logo to be linked to the Home page (the logo was not linked to home page) • 40% of users tried to avoid advertisements by scrolling back and forth • 20% of users gave up due to frustrations • 60% of the users had difficulty deciding on the first step in each task • 40% of users made navigation errors • 60% complained of small fonts and poor text-to-background contrast • Some pages had links to themselves
W2	6	40	5.6	<ul style="list-style-type: none"> • 80% of users experienced broken links on the left side of the home page • 100% abandoned one particular task due to unfamiliar terminology and lack of website status information. • 80% complained of text-to-background contrast being poor especially on drop-down menu items against the website banner • Some pages had links to themselves

Website	Loading Time (sec)	% Success rate	Mean Errors	Percentage of users under each Observations
W3	4	100	2.1	<ul style="list-style-type: none"> • 20% of users made navigation errors • 60% complained of slow PDF downloading speed • 60% complained of text-to-background contrast being poor especially on drop-down menu items against the website banner
W4	5	87	3.8	<ul style="list-style-type: none"> • 60% of users made navigation errors • 100% of the users had difficulties tracing the first step in Downloads • 60% of users complained of information overload on some pages in the website. • Download button was below the fold and one had to scroll to get it.
W5	7	67	8	<ul style="list-style-type: none"> • 100% users unable to accomplish one of the issued tasks • 80% of users faced broken links • 60% of users kept clicking on KIE expecting it to be linked with the official KIE site • 60% of users displayed frustrations after receiving same message to different requests to the website about unavailability • 100% users made errors and complained of the term SAGAs which was not familiar to them
W6	6	100	4	<ul style="list-style-type: none"> • 80% of the users made navigation errors • 100% of users complained that the menu button 'Submit A Complaint' presented a broken link and didn't allow sending of mail or message to the administrator • The Download link was below the fold, hidden together with advertisements according to 60% of users • Some pages had links to themselves

Website	Loading Time (sec)	% Success rate	Mean Errors	Percentage of users under each Observations
W7	4	93	3.2	<ul style="list-style-type: none"> 40% of users took more than 5 seconds before clicking the first time, they complained of unfamiliar terminologies The home page was flooded with big menu buttons with similar titles according to 40% of users. 60% complained of the slow loading (7 seconds) of 'Case List' page
W8	8	100	4.2	<ul style="list-style-type: none"> All the users made navigation errors 80% took more than 5 seconds before clicking the first time 60% of user experienced broken links 40% of users complained of information overload on some pages Some pages had links to themselves
W9	6	100	3	<ul style="list-style-type: none"> 60% took more than 5 seconds before their first click 80% made navigation errors 20% exhibited frustrations when they were unable to recover from the errors until the observer asked them, "Is there another way to do this?" 60% complained of information overload. Some pages had links to themselves
W10	5.5	100	4.4	<ul style="list-style-type: none"> 40% took more than 5 seconds before clicking the first time 80% of the users got distracted by the animations initially 40% of users looked bothered by the high number of flashes and animations Text-to-banner contrast was very low and text was read with strain (white text on a black background) 60% of users first clicked to FAQs to accomplish all tasks given

Website	Loading Time (sec)	% Success rate	Mean Errors	Percentage of users under each Observations
W11	4.5	100	6.2	<ul style="list-style-type: none"> Banner above the menu buttons took an average of 16.3 seconds to load and 60% of users kept waiting for it to open before starting the task 80% took more than 13 seconds before clicking the first time 60% complained of the download button being hidden below the fold and one had to scroll down The whole webpage remains the same in all web pages except for a very small part of the page at the centre. The home page had links to itself.
W12	5	100	3.8	<ul style="list-style-type: none"> 40% of users took more than 5 seconds before clicking the first time 40% of users complained of the shallow content of the information given on the website There were no drop-downs on menu items There was use of too many colours on the web pages and low text-to-background contrast.

Table 10: Analysis of test results

Clicks	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	Av.
Actual	10	14.4	8	7	13.2	5.4	6.8	5.2	6	6.4	7.2	6.8	8.03
Predicted	5	5	3	4	4	3	4	5	3	4	3	5	4
Deviation (%)	100	188	167	75	230	80	70	4	100	60	140	36	104

Table 11: Clicks per Task

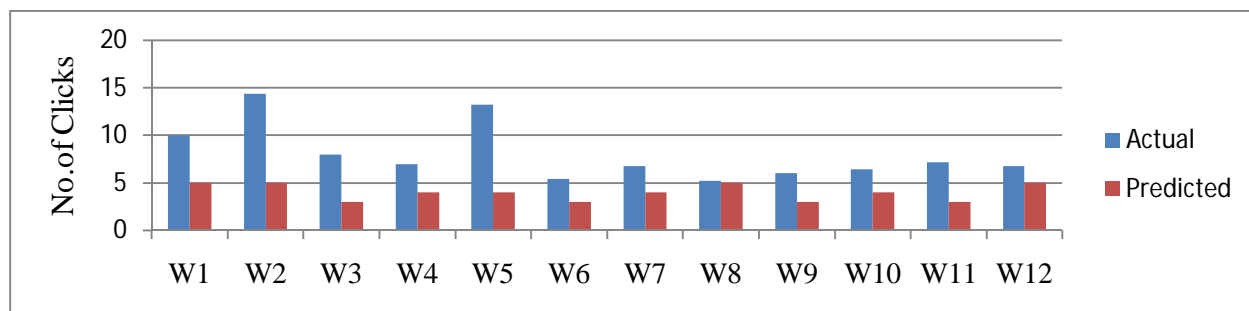


Figure 14: Clicks per Task

The deviations observed in comparing the actual clicks and the predetermined clicks per task revealed huge gaps of 104% on average implying that critical paths were not easily identified.

Website	Task	Success Rate per Participant						Task Completion Time (in seconds)					
		P1	P2	P3	P4	P5	Av. %	P1	P2	P3	P4	P5	Av.
W1	T1	1	0	1	1	1	80	17	N/A	29	36	30	
	T2	1	1	0	1	1	80	19	28	N/A	38	43	
	T3	1	1	1	1	1	100	37	30	41	30	31	
	Av.	100	67	67	100	100	87						
W2	T1	0	0	0	1	0	20	N/A	N/A	N/A	56	N/A	
	T2	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	
	T3	1	1	1	1	1	100	81	67	74	60	88	
	Av.	33	33	33	67	33	40						
W3	T1	1	1	1	1	1	100	17	23	11	13	13	
	T2	1	1	1	1	1	100	27	31	16	14	19	
	T3	1	1	1	1	1	100	5	5	3	4	4	
	Av.	100	100	100	100	100	100						
W4	T1	1	1	1	1	1	100	20	23	17	25	20	
	T2	1	0	1	1	1	80	152	N/A	113	198	177	
	T3	1	0	1	1	1	80	71	N/A	37	58	49	
	Av.	100	33	100	100	100	87						
W5	T1	1	1	1	1	1	100	24	30	38	21	23	
	T2	1	1	1	1	1	100	42	38	38	26	20	
	T3	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	
	Av.	67	67	67	67	67	67						
W6	T1	1	1	1	1	1	100	17	20	11	15	10	
	T2	1	1	1	1	1	100	6	4	4	4	5	
	T3	1	1	1	1	1	100	9	5	7	8	9	
	Av.	100	100	100	100	100	100						
W7	T1	0	1	1	1	1	80	N/A	27	25	17	20	
	T2	1	1	1	1	1	100	4	3	4	4	6	
	T3	1	1	1	1	1	100	31	16	18	22	25	
	Av.	67	100	100	100	100	93						
W8	T1	1	1	1	1	1	100	7	6	6	5	7	
	T2	1	1	1	1	1	100	13	16	18	11	16	
	T3	1	1	1	1	1	100	42	54	37	41	39	
	Av.	100	100	100	100	100	100						
W9	T1	1	1	1	1	1	100	37	39	48	31	27	
	T2	1	1	1	1	1	100	9	12	12	10	8	
	T3	1	1	1	1	1	100	6	5	8	6	6	
	Av.	100	100	100	100	100	100						

Table 12: Success Rate and Task Time

Website	Task	Success Rate per Participant						Task Completion Time (in seconds)					
		P1	P2	P3	P4	P5	Av. %	P1	P2	P3	P4	P5	Av.
W10	T1	1	1	1	1	1	100	7	12	11	8	8	
	T2	1	1	1	1	1	100	18	15	10	13	15	
	T3	1	1	1	1	1	100	22	25	13	27	24	
	Av.	100	100	100	100	100	100						
W11	T1	1	1	1	1	1	100	16	18	13	21	18	
	T2	1	1	1	1	1	100	23	37	21	34	41	
	T3	1	1	1	1	1	100	9	7	16	19	5	
	Av.%	100	100	100	100	100	100						
W12	T1	1	1	1	1	1	100	7	8	11	8	15	
	T2	1	1	1	1	1	100	18	14	18	11	19	
	T3	1	1	1	1	1	100	16	17	23	25	21	
	Av.%	100	100	100	100	100	100						

Table 12: Success Rate and Task Time

4.3.2 Survey Analysis

Results from the survey were analyzed along five constructs of usability; efficiency, learnable, memorable, Robustness and user satisfaction. The questionnaire used Likert 5-point scale from 1 to 5 representing Strongly Disagree, Disagree, Undecided, Agree and Strongly Agree, respectively. Two questions with assumed equal weights were designed for every construct. These questions were combined, averaged and analyzed in terms of frequency of similar responses (*Figures 13-19*).

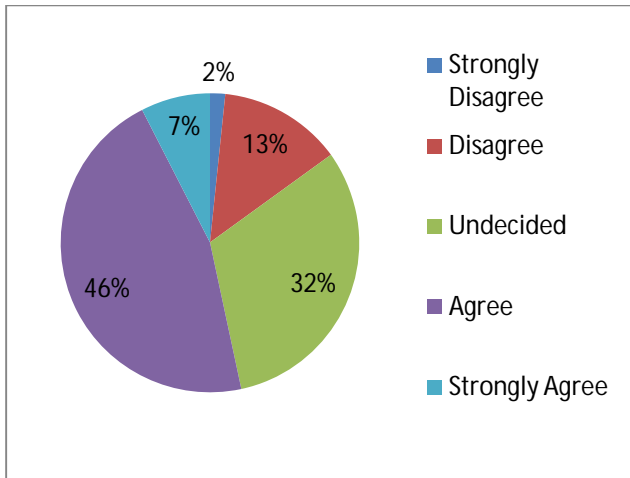


Figure 15: Efficiency

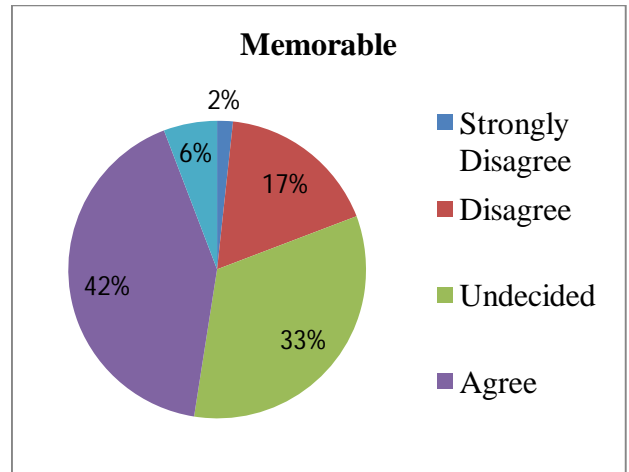


Figure 16: Memorable

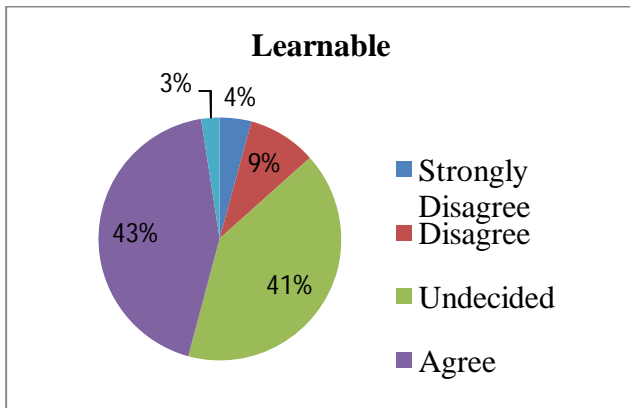


Figure 17: Learnable

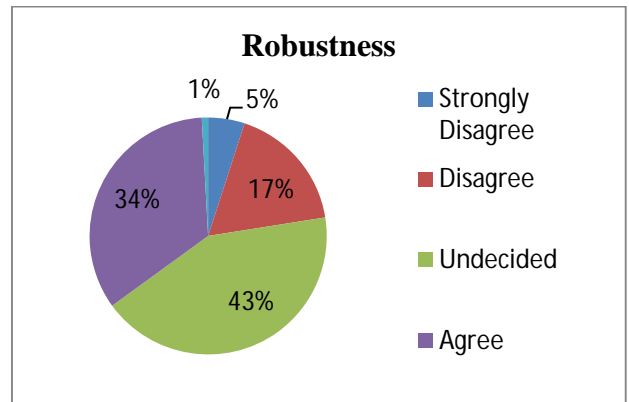


Figure 18: Robustness

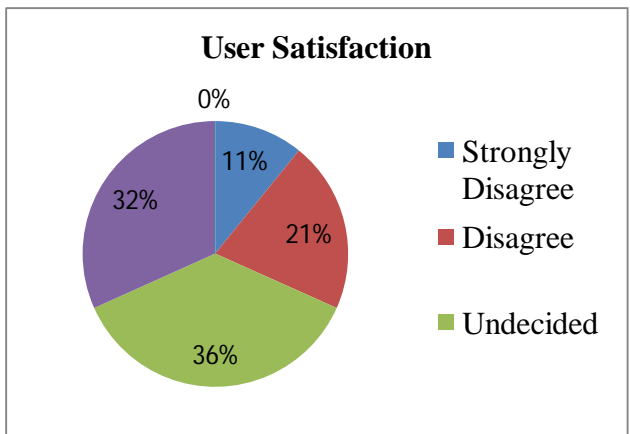


Figure 19: User Satisfaction

Those who ‘Agreed’ the website was efficient were 46%, 32% were ‘Undecided’, 13% ‘Disagreed’, 7% ‘Strongly Agreed’ and only 2% ‘Strongly Disagreed’ (*Figure 13*). Under the memorability of the website (*Figure 14*), those who ‘Strongly Agreed’ of its presence in those websites were 6%, those who ‘Agreed’ were 42%, those who were ‘Undecided’ were 33%, ‘Disagree’ were 17% and only 2% ‘Strongly Disagreed’.

Those who ‘Strongly Agreed’ the websites were learnable (*Figure 15*) were only 3%, those who ‘Agreed’ were 43%, those whose were ‘Undecided’ were 41%, 9% disagreed with the statement and 4% strongly disagreed. On robustness of the websites (*Figure 16*), only 1% strongly agreed, 34% ‘Agreed’, 43% were ‘Undecided’, 17% disagreed and 5% strongly disagreed. The user satisfaction ability of the websites (*Figure 17*) had 0% strongly agreeing, 32% agreed, 36% were undecided, 21 percent disagreed and 11% strongly disagreed.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
Efficiency	1	8	19	27.5	4.5	60
Memorable	1	10.5	20	25	3.5	60
Learnable	2.5	5.5	24.5	26	1.5	60
Robustness	3	10.5	23	23	0.5	60
User Satisfaction	6.5	12.5	22	19	0	60
Average	2.8	9.4	21.7	24.1	2	60

Table 13: Average Scores per Construct

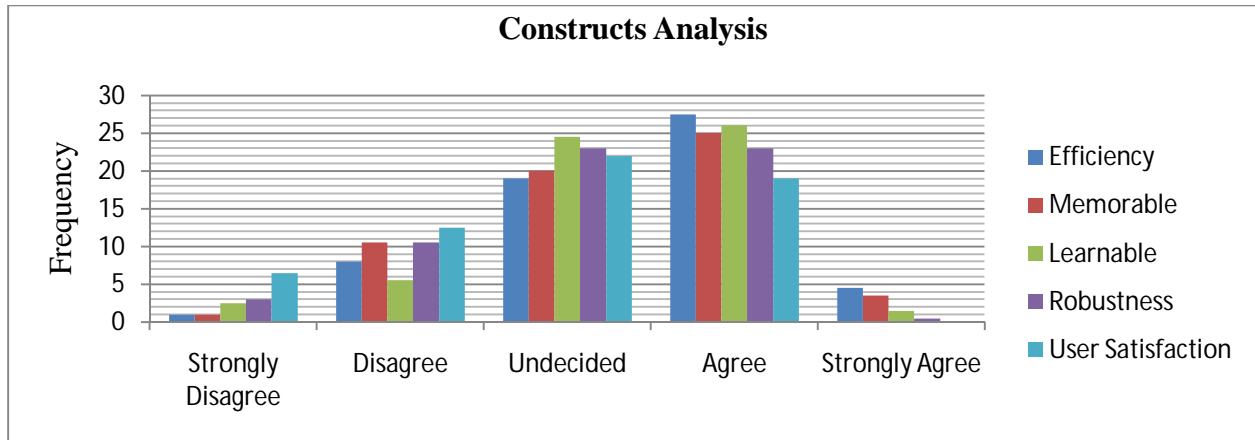


Figure 20: Constructs Analysis

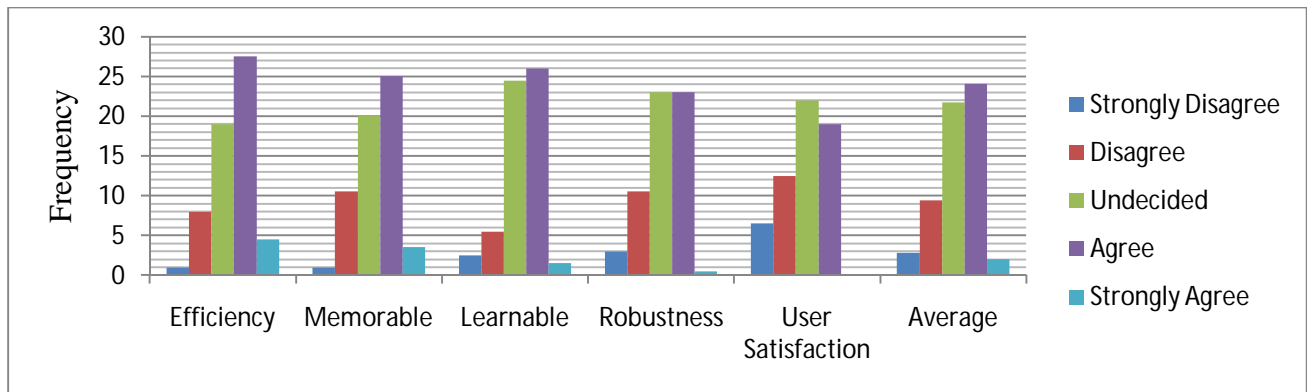
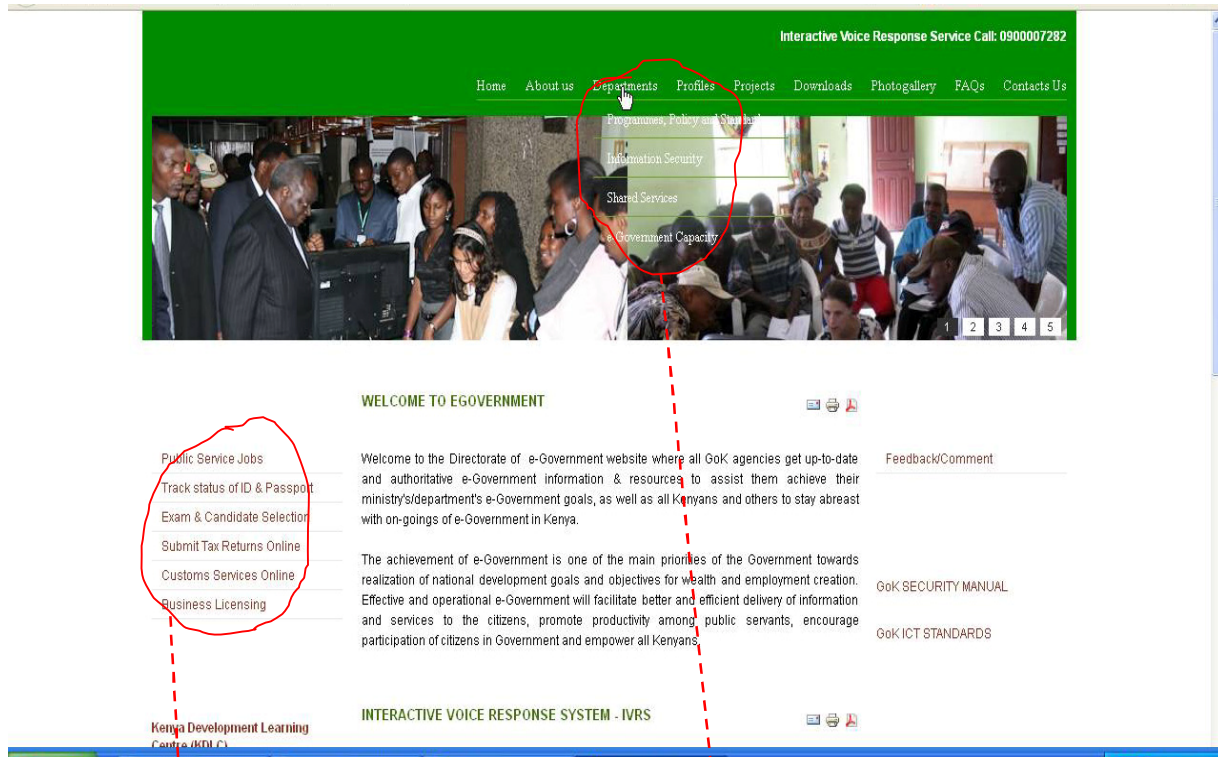


Figure 21: Constructs Analysis with Average

Other observations made during the usability testing were that:

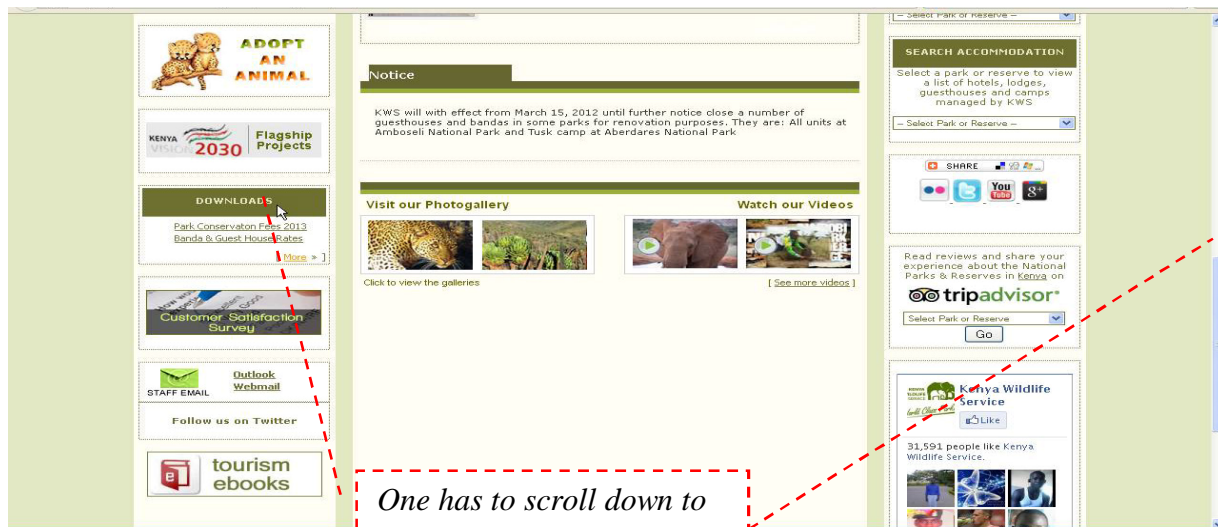
- Many government websites have used small font with no option for the user to resize the font /text.
- The websites administrators of most of the websites have not been updating their contents constantly.
- Some websites collected email addresses from the users without requiring confirmation of ownership.
- Some forms required the user to enter the date instead of automatically capturing the system date.
- In some websites, there was over-use of animations and flashes
- Over 60% of government websites have pages links that refer to themselves
- Many government websites (80%) had poor contrast between the text and the background



All are broken links except 'Submit Tax Returns Online'

Poor text-to-background contrast

Figure 22: W2



One has to scroll down to get Downloads

Figure 22: W11

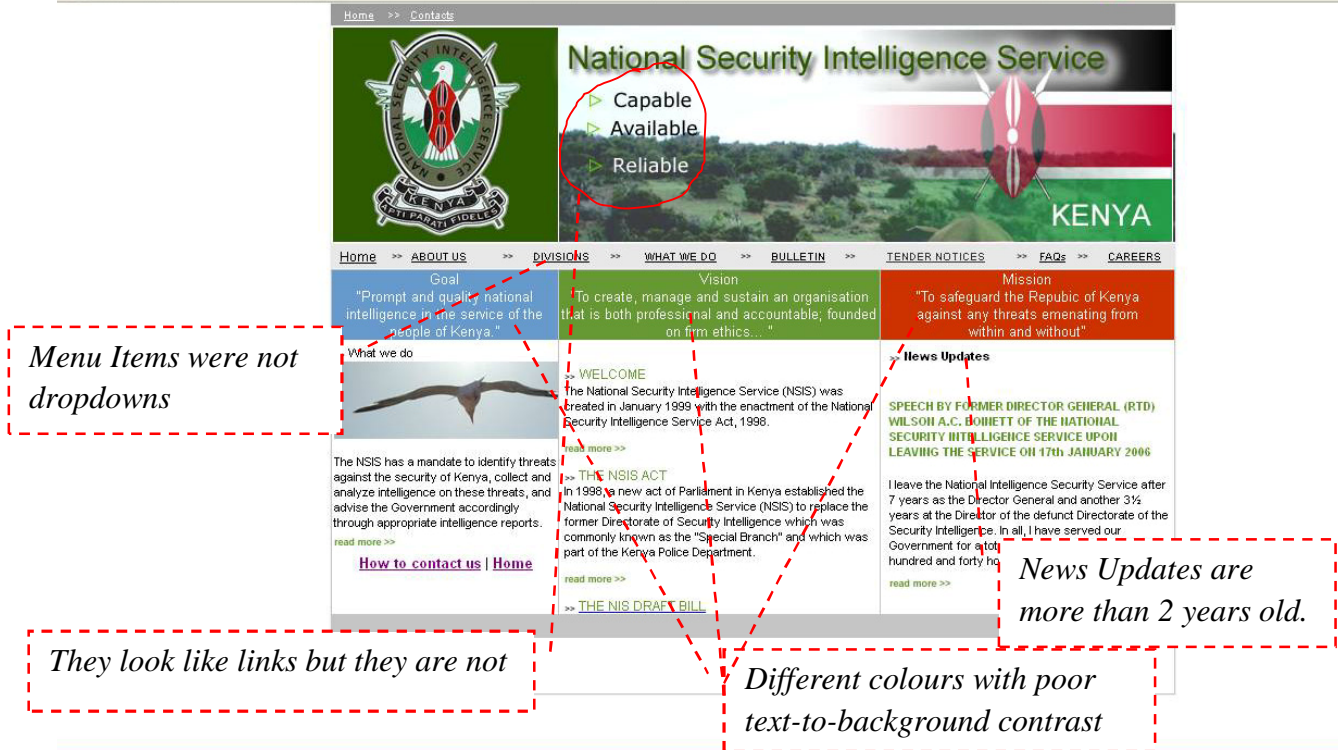


Figure 23: W12

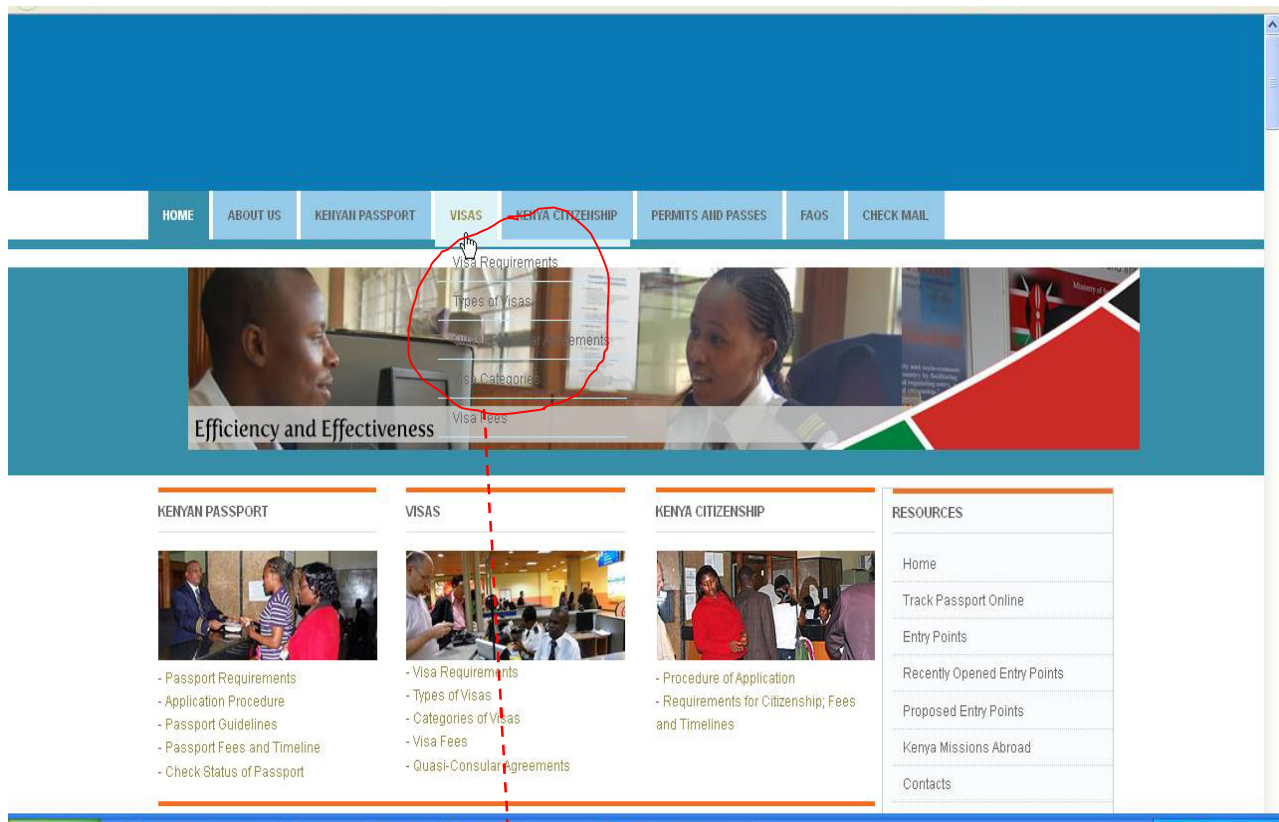


Figure 22: W3

CHAPTER FIVE

CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

5.1 Summary of the Results

The purpose of this research was to evaluate the usability and user experience of government websites in Kenya. From the results analysis discussed in chapter 4, it was revealed that some issues observed or raised about the websites were common across the websites tested while others were website specific. Many government websites have used small font with no option for the user to resize the font /text and had poor contrast between the text and the background. The websites administrators of most of the websites have not been updating their contents constantly and websites collected email addresses from the users without requiring confirmation of ownership.

In some websites some forms required the user to enter the date instead of automatically capturing the system date. In others, there was over-use of animations and flashes, with a big number of websites with pages containing links to them. The task completion rate was generally rated above average though one of the websites scored 40%. The frustration incidences averaged to 3 per website and in almost all of the frustration incidences, the user abandoned the tasks given.

Across the websites, the researcher found that more than half the users hesitated for more than five seconds before making the first click in every task. This was assumed to be the time they took to scan through the home pages before deciding on a course of action. The range (difference between minimum and maximum) of time used per task was relatively high across the tasks and websites. Out of the tested websites, more than half of them have banners that keep flashing

different pictures. These pictures have varying colours which provide a poor text-to-background contrast.

5.2 Conclusion

Based on the usability test results discussed earlier in chapter 4, the researcher reached the following conclusion for each of the research questions.

Q1. What is the usability of government websites in Kenya?

A few of government websites rated relatively well in terms of usability. The number of user complains in such websites were minimum. However, many government websites in Kenya have serious usability issues. These range from use of small font with no option for the user to resize the font /text; poor contrast between the text and the background; lack of constant update of content; collecting personal contact addresses without requiring confirmation of ownership; over-use of animations and flashes; links on a website page to itself; among others.

The consistency in terminology and design from one website to the other government website was lacking and this gave users hard time in learning to use the websites.

Q2. What is the experience of users of government websites in Kenya?

In a few of the government websites, users enjoy interacting with the site and are able to accomplish their needs without unnecessary complications. This may be partially attributed to the simplicity in their presentation, requiring minimum steps in accomplishing tasks and ease of navigation. However, a big number of government websites give users a hard time in accomplishing their tasks and users revisit the sites only as an obligation or forced by circumstances.

Government website designers and developers have focused more on information provision but have paid minimum attention in ensuring a good user experience. Users have to have prior knowledge of the terminologies used in specific institutions like Judiciary before comfortably using the institutions' websites. There were frequent incidents of frustration and in almost all of those incidences the user abandoned the tasks given, implying poor user experience in those websites.

Across the websites, the researcher found that users took around five seconds to scan through the home pages before deciding on a course of action. Comparison of the longest time spent on a task and the shortest revealed big gaps which implied lack of acknowledgement of novice and expert users by the designer. The use of a small non-resizable font implied that the designer took assumption that users have equal visual ability and this disadvantage those with visual challenges making their experiences poor.

Most of the usability issues with Kenyan government websites concerns more of the basic requirements of a usable website than specialized concerns. Institution logos should link to the home page of the website, and the website should always show the user its status. A link on a web page linking to the same page brings confusion, wastes time and compromises efficiency of the website. There lacks uniform guidelines, standards for designing of Kenyan government websites that would allow users who have visited one government website, to comfortably interact with any other government website. The use of non-representative and dissimilar terms on various government websites' menus make it harder for users to benefit from their previous visit to government websites while interacting with another.

5.3 Limitations

Usability testing is a rigorous exercise and one need to be thorough, which it turn require a lot of time and resources. The more frequent the websites are tested the more issues one would discover. In light of the duration that was available and the scarce financial resources the researcher was only able to test the twelve websites once. By definition, usability is context and function specific and hence capturing those usability issues that are specific to certain users in certain contexts may require more specific profiling. This study focused on the usability issues that affect the general user in context of a general or normal use of the website.

5.4 Recommendation

Rubin and Chisnell (2008) states that there should be no frustration in using a usable product, an argument supported by Cappel & Huang (2007) who argued that a usable website should be clear, simple, consistent and easy for users to use. United Nations e-Government Survey (2012) revealed that the online provision of government services has changed from supplier perspective to a more consumer demand driven with emphasis on citizen usage.

With Kenya's human capital rating better than the worlds average but the e-participation and usage rating less than quarter of the world average (UN survey, 2012), there is need to continuously improve on areas that may encourage government website usage and hence e-participation in governance.

In light of the discussions in chapter 4 and the conclusion in chapter 5, the researcher would recommend a more thorough attention in usability of government websites. Guidelines and standards need to be established for all government websites. There is a need to establish a government official website or portal that will offer services seamlessly from all government

institutions. Also, the individual government institutional websites need to conform to a uniform or similar design, theme and use of terminologies, with an easy access to the official government portal.

5.5 Future Research

Currently there are 288 government websites in Kenya according to KeNIC (2013) and testing a bigger sample, frequently may reveal more issues. It would be interesting to have a research study on the usability and user experience using a bigger sample giving more focus on specific use and user contexts. This would allow a thorough evaluation of a wider range of government websites which may unearth issues specific to certain websites, users and use.

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Appendix A: Study Objectives and Data Source Mapping

Data source	Data Collected	Objective
Observation	<ul style="list-style-type: none"> • Number of clicks per task • Website loading time • Number of errors per task • Success rate • Task completion time • Consistency in terminology and design • Frustration 	Evaluate the efficiency, learn-ability, memorability, robustness and the user satisfaction
Questionnaire	<ul style="list-style-type: none"> • User's opinion on loading speed • User's opinion on speed of locating items 	Evaluate the efficiency
Questionnaire	<ul style="list-style-type: none"> • User's opinion on number of steps per task • User's opinion on general presentation 	Evaluate the
Questionnaire	<ul style="list-style-type: none"> • User's opinion on self-descriptiveness • User's opinion on ease of navigation 	Evaluate the ease of learning
Questionnaire	<ul style="list-style-type: none"> • User's opinion on ease of use • User's opinion on enjoyment 	Evaluate the robustness
Questionnaire	<ul style="list-style-type: none"> • User's opinion on attractiveness • User's opinion of possibility of revisit 	Evaluate user satisfaction
<ul style="list-style-type: none"> • Debriefing interview 	<ul style="list-style-type: none"> • Issues of text-to-background contrast • Issues of font size and zoom options • Issues of logo link to Home page • Issues of critical content below fold 	Identify the weaknesses of government websites in terms of usability and user experience and their possible causes.
<ul style="list-style-type: none"> • Observation result analysis • Questionnaire result analysis 	<ul style="list-style-type: none"> • Learnability, memorability, robustness, efficiency and user satisfaction 	

<ul style="list-style-type: none"> • Analysis of identified weaknesses W3C standards 	<ul style="list-style-type: none"> • Perspective of W3C standards on the identified weaknesses and how the benchmarks have dealt with it. 	<ul style="list-style-type: none"> • Suggest solutions for the identified weaknesses
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Appendix B: List of Tasks per Website

W1 <http://www.revenue.go.ke>

- T1- You want to buy a second hand car from a Kenyan citizen. Download a Motor Vehicle Transfer form from the website.
- T2- Print the list of all VAT offices physical locations
- T3- Print the names of the currently suspended customs Clearing Agents

W2 <http://www.e-government.go.ke>

- T1- Send the administrator this message “Do you have job vacancies?”
- T2- View the selection of Candidates to Kambui Girls’ High School centre number 11205308.
- T3- Download e-government strategy (2004)

W3 <http://www.immigration.go.ke>

- T1- Check Passport Application requirements
- T2- Download Passport Application Form (Form 19)
- T3- Check about the four types of Visas

W4 <http://www.ppoa.go.ke>

- T1- Check available job vacancies
- T2- Create an e-learning account
- T3- Contact the administration to report violation of the Public Procurement Procedures (Get to the page where you type the communication)

W5 <http://www.education.go.ke>

- T1- You want to register a new school access the requirements (as per the ministry of education).
- T2- Download a guide on safety standards requirements for a school
- T3- Access information about the functions of Kenya Institute of Education (KIE) as a partner of Ministry of Education.

W6 <http://www.rba.go.ke>

- T1- Download the Complaint Form
- T2- Access information about the benefits of being a member
- T3- Access information about the types of Retirement benefit schemes

W7 <http://www.judiciary.go.ke>

- T1- Check the cases scheduled for April 23rd, 2013 at the High Court of Kenya Milimani Law Courts
- T2- Access information on the characteristics of Judiciary Ombudsperson
- T3- Access the list of names of judges of the judiciary

W8 <http://www.eacc.go.ke>

- T1- Check for available job vacancies
- T2- Download Public Officer Ethics Act
- T3- Report a Bribery by a police, Subject – Jaribu, details – ‘testing’, Province - Unknown, District – Unknown, Amount – unknown, form –Failure to take action, No documentary support,

W9 <http://www.cck.go.ke>

- T1- You want to complaint about an adult rated movie aired by a particular TV station at an inappropriate time. Download a complaint form.
- T2- Access and print the role of CCK in consumer protection.
- T3- Open the page with the Organizational Structure of CCK

4.4.10 <http://www.knice.go.ke>

- T1- Access the list of Kenya National Integrated Civic Education implementing partners
- T2- From the website, get the answer to whether a non-citizen can own land.
- T3- Download K-nice curriculum

4.4.11 <http://www.kws.go.ke>

- T1- Download Application Form to the KWS Training Institute
- T2- You plan to visit Nairobi Safari Walk. Check hours of operation from the website.
- T3- Check the current rate per hour, of hiring KWS helicopter.

4.4.12 <http://www.nsis.go.ke>

- T1- Check when the National Security Intelligence Service was created.

- T2- Get information on how one can join National Security Intelligence Service
- T3- Send the administration a message “just visiting the site” but do not input your email address

Appendix C: Screening Questionnaire

TEST PARTICIPANT RECRUITMENT QUESTIONNAIRE (SCREENER)

James Mwangi Kinuthia,

University of Nairobi,

School of Computing and Informatics,

P.O. Box 30197,

Nairobi

Dear Sir/Madam,

I am a student at the University of Nairobi pursuing a course leading to master of science degree in Information Systems. As a partial fulfillment for the award of this degree, I am conducting a study with the title “GOVERNMENT WEBSITE USABILITY AND USER EXPERIENCE IN KENYA”. I intend to recruit volunteer participants to take part in the study.

This questionnaire is intended to assist me in arriving at an optimum sample representation for the group of website test participants. For this purpose, please respond to the following questions:

1. Would you be willing to volunteer and participate in our Website Usability Testing study? (Tick appropriately)
 - a. Yes
 - b. No
2. If you were asked to participate in this study which location would be best for you? (internet access would be required)
 - a. Nairobi (CBD)
 - b. Thika (town)
 - c. Kiambu (town)
3. How old are you?
 - a. 18-35
 - b. 36-54
 - c. 55 and above
4. What is your gender?
 - a. Male
 - b. Female
5. What best describes your current status?
 - a. Student (specify course)_____
 - b. Employed

- c. Self- Employed
 - d. Retired
 - e. Other
6. How would you describe your vision?
- a. Good vision
 - b. Fair Vision (long/short sighted)
 - c. Colour Blindness
7. Have you ever been diagnosed with a reading learning disability?
- a. Yes b. No
8. How would you rate your skill with the internet use?

On a scale of 1-5, where 1 is not skilled at all and 5 is highly skilled.

1	2	3	4	5
Not at all	Somewhat	Moderately	Highly	Very Highly
Skilled	Skilled	Skilled	Skilled	Skilled

9. How much time do you spend surfing the internet per week?
- a. Less than 1 hour per week
 - b. 2-4 hours per week
 - c. 5-10 hours per week
 - d. More then 10 hours per week
10. What kinds of tasks do you do on the internet? (please circle all that apply)
- a. E-mail
 - b. Shopping
 - c. Looking up information
 - d. Networking/community (chat groups etc)
 - e. Surfing the web

f. Other (please describe) _____

11. Do you have experience completing/filling out online forms?

a. Never b. Once or twice c. 3-5 times d. More than 5 times

12. Are there any other accommodations or issues that we should be aware of that you will need to participate in the study (such as fatigue, equipment, communication)?

We will contact you in the next few days to let you know if we have selected you as a participant.

Please give us your contact information:

Name _____

Address _____

Phone number _____

E-mail _____

What would be the best way to contact you?

Note that we may not be able to include everyone depending on the number of volunteers and profile mix.

Thank you for your time.

Appendix D: Invitation and Introduction Letter

James Mwangi Kinuthia

University of Nairobi

School of Computing & Informatics

P.O. Box 30197,

NAIROBI

0720 533 447

Dear _____

RE: USABILITY TESTING INVITATION

Following your previous indication of availability to volunteer in participating in the usability testing for the government websites, I would like to invite you for the same exercise at _____ . I will call you within the next two days to fix a convenient time and date for you.

The exercise is to assist me in carrying out a research study on **Government Websites Usability and User Experience** in Kenya, as a partial fulfillment of the requirements of master degree in Information Systems at the University of Nairobi.

Please note that after the usability testing a certificate of participation will be issued by Africa Nazarene University in conjunction with Academixed Technologies. Do not hesitate to call me through 0720 533 447 for any clarification.

Regards,

James Mwangi K
UoN student

Appendix E: Consent and Material Release Form

I agree to participate in the study conducted and videotaped by James Mwangi (research student – University of Nairobi).

I understand and consent to the use and release of the audio and videotape by the said student. I also understand that the information and videotape is **for research purposes only and** that my name, voice and image will not be used for any other purpose apart from this research study. I relinquish any rights to the recorded material and understand it may be copied and used by James Mwangi without further permission.

I agree to immediately raise any concerns on areas of discomfort with the research study administrator and I understand that I can leave the test session at any time I wish to.

Your signature: _____

Date: _____

Name: _____

Thank you!

We appreciate your participation.

Appendix F: POST-TEST QUESTIONNAIRE

James Mwangi Kinuthia,

University of Nairobi,

School of Computing and Informatics,

P.O. Box 30197,

Nairobi

Dear Participant,

Thank you for participating in this study and most importantly for sacrificing your time towards this research study. This short questionnaire will assist in capturing your general experience through out the test, as you interacted with the website.

You will be given a random number by the test facilitator.

Your Randomly Assigned Number: _____

Please select the answer that best suits your experience today. (Tick Appropriately)

No.

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Q1	The website loads fast.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q2	I am able to find what I need quickly on this website.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q3	It requires the fewest steps possible to accomplish what I want to do with it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q4	The website has a clean and simple	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

presentation.

Q5	The website is self-descriptive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q6	It is easy to navigate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q7	This website is easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q8	I enjoy using the website.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q9	I found the website to be attractive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q10	I will likely visit this website in future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix G: Interview Guide

Usability Testing Debriefing Interview Guide

Thank you again for agreeing to sacrifice your time and participate in the usability testing.

Before you go, I would like you to tell me about:

- The main challenges you faced interacting with the website
- What you like about the website

I noticed during the exercise that you ... *(based on observed behaviour)*... , would you mind telling me why you did so?

I noticed you commented on the questionnaire that ...*(based on questionnaire responses that need clarification)*..., would you mind to clarify a little bit?

- What would you suggest to be improved on the website?

Thank you _____ for your time and I appreciate your contribution. This is your certificate of participation. God (Allah) bless you.

Appendix H: List of Websites

Initials Assigned	Website Home Page
W1	http://www.revenue.go.ke
W2	http://www.e-government.go.ke
W3	http://www.immigration.go.ke
W4	http://www.ppoa.go.ke

W5	http://www.education.go.ke
W6	http://www.rba.go.ke
W7	http://www.judiciary.go.ke
W8	http://www.eacc.go.ke
W9	http://www.cck.go.ke
W10	http://www.knice.go.ke
W11	http://www.kws.go.ke
W12	http://www.nsis.go.ke