EVALUATING AND ENHANCING WEBSITES: A CASE STUDY OF AN ERITREAN STATE OWNED MEDIA WEBSITE – SHABAIT.COM
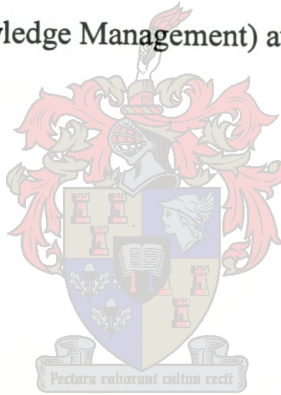
Siham Mukhtar Mahmoud

Assignment submitted in partial fulfilment of the requirements for the degree of Master of Philosophy (Information and Knowledge Management) at the University of Stellenbosch

Supervisor: Dr MS van der Walt

December 2004

Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature: **Date:**

Abstract

The Ministry of Information of Eritrea is basically aimed at providing the society with news, information, education and entertainment. In addition to its service presentation through radio, TV and printed press the Ministry of Information has taken the initiative to present its services in the digital way by publishing a website known as shabait.com. But as the technique is new to the country as well as to the organization, it is to be expected that there will be inaccuracies in the way the website was designed. Hence, evaluating and redesigning shabait.com with the goal of making it informative, attractive and easy to use will be very beneficial to the organization as well as to users of the website.

This recently launched website is not very attractive and not successfully directed to its users. Therefore, the main aim of this study is to assess and find the best way of presenting information digitally to the Eritrean society, as well as to anyone interested in finding out about Eritrea through the State owned media website.

This study was firstly approached by gathering previously written relevant information from books, journals, and the Internet. In addition to that interviews with concerned people in Eritrea were held to understand the aim, difficulties and challenges of the website. Subsequently the website was assessed according to the evaluation criteria developed, based on the literature review. The evaluation of the website assumed three different approaches of qualitative as well as quantitative types. A usability test with both quantitative and qualitative questions was done through a questionnaire, which was analyzed statistically. A competitive analysis, of qualitative type with two international websites was also made.

In order to create a good quality website, it is essential to have clearly specified goals, policies and strategies, and adequate advanced human as well as technological resources, so that it will be easy to overcome the common challenges such as competition, diversity of users, budget constraints, and inadequacy of policy instruments. The findings of the evaluation of shabait.com indicate that the website is not attractive, is user unfriendly, of low content quality as well as with low download speed and, more importantly, was not advertised well. Therefore, shabait.com is not fit to be considered as a sole first hand information provider website for the Eritrean society as well as for anybody who is concerned about Eritrea. At the end of the study recommendations of how the website can be modified to be successful are listed.

Opsomming

Die doelwit van die Ministerie van Inligting van Eritrea is om nuus, inligting, opvoeding en vermaak aan die gemeenskap te verskaf.

Bykomend tot die radio, TV en die gedrukte media, het die Ministerie van Inligting nou ook besluit om 'n digitale diens te lewer deur middel van 'n webwerf bekend as shabait.com. Aangesien die betrokke tegnieke vir die land sowel as vir die organisasie iets nuuts is, kan daar verwag word dat die ontwerp van die webwerf onakkuraathede sal toon. Dus moet shabait.com evalueer en verbeter word om dit sodoende aantreklik en gebruikersvriendelik te maak; dit sal tot die voordeel strek van die organisasie so wel as die gebruikers.

Hierdie jong webwerf is tans nie baie aantreklik of maklik om te gebruik nie. Dus is die doelwit van hierdie studie om die beste wyses te vind om die gemeenskap van Eritrea, sowel as ander belangstellendes, deur middel van 'n webwerf wat deur die staat beheer word, digitaal van inligting te bedien.

Relevante geskrewe inligting is bekom deur middel van boeke, joernale en die Internet. Daar is ook onderhoude gevoer met mense betrokke by shabait.com om sodoende die doelwitte, probleme en uitdagings van die webwerf beter te verstaan. Daarna is die webwerf evalueer volgens ontwikkelde kriteria gebaseer op die literatuuroorsig. Vir die evaluasie is drie benaderings gebruik, beide kwalitatief en kwantitatief. 'n Bruikbaarheidstoets is deur middel van 'n vraelys gedoen met kwalitatiewe sowel as kwantitatiewe vrae en die antwoorde is statisties ontleed. Twee internasionale webwerwe is ook ontleed sodat hulle gehalte met dié van shabait.com vergelyk kon word.

Om 'n webwerf van goeie gehalte te ontwerp, is dit noodsaaklik om duidelik omskrewe doelwitte, beleide en stategië, asook genoegsaam opgeleide mense en gevorderde tegnologiese hulpbronne te hê sodat die uitdagings soos kompetisie, verskeidenheid van gebruikers, begrotingsbeperkings en swak beleidsinstrumente oorkom kan word. Die bevindinge van die evaluasie van shabait.com toon dat die webwerf onaantreklik en gebruikersonvriendelik is, die inhoud is van swak gehalte, die aflaai spoed is laag en en die werf is nie goed adverteer nie. Daarom is die werf nie geskik om beskou te word as die enigste eerstehandse inligtingsverskaffer webwerf vir die gemeenskap van Eritrea sowel as ander belangstellendes nie. Aan die einde van die studie is daar aanbevelings vir die verbetering van die webwerf.

Dedication

I dedicate this paper to my parents Zeineb Ahmed and Mukhtar Mahmoud whom, without their love, wisdom, and guidance I would not have reached this level.

Acknowledgements

The completion of this thesis would not have been possible without the help of friends, colleagues and institutions. Hence I take this opportunity to express my gratitude and thanks to:

- My supervisor Dr. van der Walt, for giving me resourceful ideas and professional guidance from the beginning of the study.
- Carey Bremridge and all the participants of thesis support group in the University of Stellenbosch, for the priceless advice on how to deal with the stress associated with writing a thesis.
- Dr. Martin Kidd for helping me with the statistical analysis since I started formulating the questionnaire.
- Heide Lehmann, for all her efforts in proof reading the first draft of my thesis.
- Sarah Duff, for helping me proof read some of the chapters.
- Jennifer de Beer, for assisting me with sources.
- My friend Eden Berhe, for her constant moral support.
- My family and friends, for their frequent support through e-mails and phone calls.
- All my friends in Stellenbosch for their daily support.
- Yoftahe Mussa, Habtegergish Tesfamariam, the staff of the Ministry of Information and Ministry of Transport and Communication of Eritrea for cooperating with me when gathering information pertinent to the study.
- All individuals who cooperated with me in filling the questionnaire when gathering feedback during the time of evaluation of shabait.com.
- Melanie Bailey, for editing the final version of the thesis and translating the abstract into Afrikaans.

Table of contents

List of tables

List of figures

List of Abbreviations

Alt	Alternative
CGI	Common Gateway Interface
CTS	Computer Technology Services
GIF	Graphic Interchange Format (file extension)
HTML	Hyper Text Markup Language
ICT	Information and Communication Technology
ISP	Internet Service Provider
JPEG	Joint Photographic Experts Group
MOI	Ministry of Information
NGO	Non-Governmental Organization
PC	Personal Computer
PDF	Portable Document Format (Adobe Acrobat)
SOP	Standard Operating Procedure
TSE	Telecommunication Services of Eritrea
UNISA	University of South Africa
URL	Uniform Resource Locator
W3C	World Wide Web Consortium
WAMMI	Website Analysis MeasureMent Inventory
WWW	World Wide Web
WYSIWYG	What You See Is What You Get
XML	eXtensible Markup Language

1. Chapter One

Introduction

1.1. Preliminary study

Nowadays, the deployment of a web presence is seen as a strategic mission in many organizations (Alsup, 2000). This is because the Internet has introduced major changes in the way organizations, including government organizations, conduct business. It has brought about a dramatic drop in the cost of creating, sending and storing information while making that information more widely available. As a result millions of people can exchange massive amounts of information directly, instantly, and almost for free (Laudon & Laudon, 2002:106). However, according to Taylor (1999:2) retrieval of information is highly dependent upon its organization and the main aim of making information present in a website is so that it can be retrieved and therefore it needs to be organized properly.

Knowing what customers truly want and staying ahead of the competition is crucial to business success (Malhotra, 1996). If any website is to be successful it will have to be genuinely useful to the target audience, meeting their needs and expectations without being too hard to use (Lynch & Horton , 2002). They are the potential readers of the website; hence its design should be structured to meet their needs and expectations (Lynch & Horton, 2002).

The objective of any information retrieval system is that it should be used by the group of people for whom it was designed (Rowley & Farrow, 2000:96). Their feedback helps develop the usability of a product which is the degree to which specific users can achieve specific goals within a particular environment, effectively, efficiently and comfortably, and in an acceptable manner (Booth, quoted in Rowley & Farrow, 2000:96). Hence, feedback from users during the development process and for evolutionary refinement can provide useful insights and guidance (Shneiderman, 1987:32).

The key principle for maximizing usability according to Brinck, Gergle & Wood (2000: 16), is to employ iterative design, which progressively refines the design through evaluation from the early stages of design. The evaluation steps enable the designers and developers to incorporate user - and client feedback until the system reaches an acceptable level of usability (Brinck, Gergle & Wood, 2002). Despite their unique challenges, every significant web project passes through these evaluation steps (Lynch & Horton, 2002).

1

1.2. Motivation

Eritrea had one of the most sophisticated telecommunication networks in the 1950's, but today it is one of the least developed countries with regard to telecommunications infrastructure on the continent (Andemariam, 1999:233). The Internet was introduced in the country only in November, 2000 with half MB bandwidth. Hence the use of Internet is still at its early stage in Eritrea.

The Ministry of Information of Eritrea basically aims at providing the society with news, information, education and entertainment services. Alongside its service presentation through radio, TV and printed press, the Ministry of Information has taken the initiative to present its services in the digital way by publishing a website known as Shabait.com. This shows a change in the business model of the organization. According to Laudon & Laudon (2002:106) a business model is an abstraction of what and how an enterprise delivers a product or services, showing how the enterprise creates wealth. But as it is a new technique to the country as well as to the organization it is likely to have inaccuracies in the way the website is designed.

If the design of the website is simple and attractive, it will market the institution and programmes, provide easy access to information for website visitors, and be reasonably easy to manage and maintain (Boucher & Smith, 2000). Hence, evaluating and redesigning shabait.com with the goal of making it both beautiful and easy to use will be very beneficial to the organization as well as to users.

1.3. Problem statement and objectives

Eritrea's ministry of information is inexperienced in the Internet communication system and web design, and there is no website that truly represents the ministry's objectives and policies or meets the needs of users. The recently launched website, Shabait.com is not very attractive and not sufficiently directed to its users (i.e. user unfriendly). Thus much work is needed to change the website into one that can promote the objectives of the Eritrean Ministry of Information and please its users. The broad objective of this study is to assess and find the best way of presenting information digitally to the Eritrean society as well as to anyone interested to know about Eritrea through the State owned media website.

The major specific objectives of the study are to:-

- describe the vision, strategy and business model of the organization
- identify the difficulties and challenges the website is facing
- determine the good qualities as well as shortcomings of the website
- identify the available technological and human resources and constraints
- observe user satisfaction and expectations from using the website
- mark the benefits that the Ministry of Information can get from the website
- identify the benefits that the Eritrean society gets from the website
- recommend the best structure the website should have, and lastly
- design the recommended enhanced website

1.4.   Methodology of the study

Based on the objectives listed above, it has become necessary to use two different but interdependent methodologies for the study. These methodologies were interviews and the evaluation of the researched website, and each consisted of various approaches. But initially data pertinent to the topic was gathered from different books, journals, and the Internet.

1.4.1. Interviews

Interviews and discussions with the officials were held to identify the vision, policies and business strategies of the organization. Similarly, to get information about the ICT potential of the country interviews were held with the officials at the Ministry of Transportation and Telecommunication. Due to the fact that the main objective of the study is to enhance an existing website, the webmaster and other technical staff of the website were interviewed to share ideas with. This included ideas such as their blue print when building the website, their future plans and difficulties during website development. Moreover the ongoing process of updating the website and publishing new pages which is being done at the moment was observed regularly for several days. Likewise, an interview was held with the web master of the competitor website, shaebia.com.

1.4.2. Evaluation of website

The website was evaluated according to evaluation criteria that were developed based on the literature review. Hence, the evaluation of the website assumed two different approaches: a qualitative as well as a quantitative approach. Both quantitative and qualitative usability tests

3

were done which were analyzed statistically and competitive analysis of a qualitative type was done.

1.4.2.1. Usability test through questionnaire

A questionnaire of 48 questions grouped into 8 sections was designed based on the criteria developed from the literature review. The questionnaire was distributed through e-mails to possible users and each user was asked to forward it to as many people as possible. A sample of 14 users was used for the analysis of the results which was performed using statistical software, Statistica.

1.4.2.2. Competitive analysis

This methodology helped the researcher assess the organization's competitiveness in the world of the Internet. This competitive analysis included two sets of comparisons which focused on content organization as well as interface design. Specific websites for comparisons were chosen at the time of evaluation. Design critiques were done on similar international websites, bbc.co.uk as well as china.org.cn, and were compared to the researched website.

1.5.   Impact

It is hoped that this paper will have a great impact to the Ministry of Information by helping it to employ the best method of service presentation to the public in order to afford the audience ultimate satisfaction. Also it can help users of the website get a better, fast and easy-to-use website that they can rely on for getting first-hand information. Besides, as the main income of the Ministry of Information is from marketing, the study can also help the organization to use the website as an income generator by fully utilizing the website's ad banner. Hence this study will definitely have an impact on both the Ministry of Information as a service provider organization, as well as the Eritrean society and everybody who is reliant on that website for finding information about Eritrea.

1.6.   Scope and Limitations

The literature review of the study comprises a broad investigation into website development. Although it includes all the stages any website passes through before and after publishing, it is more focussed on government as well as media websites. However, an actual evaluation has been done only on one website, the shabait.com.

4

The limitation of the website was that at the time of evaluation, information from the server log as well as information about actually existing users of the website could not be obtained.

1.7.   Overview of chapters

Chapter 1 – This chapter consists of the preliminary study, motivation the problem statement and objectives of the study. The methodology, impact scope and limitation of the study are also described.

Chapter 2 - This chapter deals with the basic factors to be considered when developing a website. These are the business concept of the organization, input needed for the website and challenges that are faced during development.

Chapter 3 - This chapter deals with the process to be followed when developing a website. Every website should follow each of the following eight steps: the design critique, website definition and planning, website specification, information architecture, website design, website construction, website marketing and website maintenance.

Chapter 4 - This chapter shows how the success of websites is measured. It is measured by performing different kinds of tests based on certain criteria. The evaluation criteria are quality of content, content organization, attractiveness, user control, efficiency, helpfulness, learnability and accessibility. The processes of evaluation are analyzing the results of the usability test, competitive analysis as well as information from server logs.

Chapter 5 -This chapter gives the background history of the website shabait.com. It contains overviews of Internet in Eritrea, the Ministry of Information, the researched website, and its major competitor. Moreover, it points out the difficulties and challenges the website is encountering.

Chapter 6 - This chapter is about the fitness of the researched website at the time of the evaluation. It describes the evaluation criteria and process but it focuses on the actual evaluation of the website, hence the result and its analysis.

Chapter 7 - This chapter presents a summary of the above five chapters as well as the conclusion and recommendations.

1.8. Definitions

Content management:- (according to Forrester Research) is a combination of well-defined roles, formal processes, and supporting systems architecture that helps organizations contribute, collaborate on, and control page elements such as text, graphics, multimedia and applets (Guenther 2001).

Goal/objective: - A goal or an objective is the purpose toward which an endeavour is directed or something worked toward or striven for (Dictionary.com).

Metadata: - is definitional data that provides information about or documentation of other data managed within an application or environment (Rosenfeld & Morville, 2002:176).

Organization: - The technical definition of an organization is a stable, formal, social structure that takes resources from the environment and processes them to produce outputs (Laudon & Laudon, 2002: 69).

The behavioural definition on the other hand, is a collection of rights, privileges, obligations, and responsibilities that are delicately balanced over a period of time through conflict and conflict resolution (Laudon & Laudon, 2002: 69).

Policy:- A policy according to a wordNet Dictionary (2003) is "a plan of action adopted by an individual or social group". Moreover, according to Merriam Webster's Online Dictionary (2003) "a policy is a specification of behaviours or actions to be taken in the managed environment". Another wider definition is "a set of principles and strategies which guide a course of action for the achievement of a given goal" (Montviloff, 1990:7). Hence the definition of policy that can be derived from the three definitions is a set of principles and strategies which guide a course of action for the achievement of a given goal in a social group with a managed environment.

Strategy: - Strategy is a plan designed to achieve a particular long-term aim (AskOxford.com, 2004). It describes how resources will be organized, and the policies that will apply for the management and use of those resources (Stark, 2000). Hence a strategy is the means by which policy is put into action.

Webpage: - A document on the World Wide Web, consisting of an HTML file and any related files for scripts and graphics, and often hyperlinked to other documents on the Web.

<u>Website</u>: - A set of interconnected webpages, usually including a homepage, generally located on the same server, and prepared and maintained as a collection of information by a person, group, or organization (dictionary.com, 2004).

1.9.   Summary

This chapter is the introductory chapter that presents the overall background of the thesis. A preamble of the literature study, motivation for writing the thesis, the problem statement and the main objectives of the study are described. The research problem is to assess and find out the best method of presenting news and information about Eritrea through the Internet. The objectives are to assess the strength, weakness, difficulties, and challenges of the website and find out the best possible design that can lead the website to success. Moreover, the methodology of the study which comprises both literature review and empirical study is stated. The scope and limitations of the study as well as the impact of the study are also described. Also concepts used throughout the thesis are defined in this chapter.

2.   Chapter Two

Factors to be considered when developing a website

2.1.   Introduction

Nowadays due to the introduction of major changes in the way business is conducted in organizations through the Internet, websites are used to promote business in addition to the traditional ways. Spreading information is no longer limited to traditional physical methods of delivery. The Internet has brought about a dramatic drop in the cost of creating, sending, and storing information while making that information more widely available; millions of people can exchange massive amounts of information directly, instantly, and almost for free (Laudon & Laudon,2002:106; Rappa,2003).

Meanwhile, these websites are expected to be workable, user friendly and to promote the objectives and mission of the organizations. Besides, they are likely to help organizations attain competitive power in the global market as well as help users obtain satisfaction.

The main objective of this chapter will be to identify the basic factors that need to be considered during website development. These factors include the business concept of the organization, input required for developing websites, and the challenges that organizations face when developing websites and putting them on the Internet.

2.2.   Business concept of an organization

From the two definitions of organizations, it can be seen that they can be different in nature technically as well as behaviourally.

Organizations have common features such as formal structure, SOPs, politics, and culture (Laudon & Laudon, 2002:73). However, they have more unique features such as organizational type, environments, goals, power, constituencies, function, leadership, tasks, technology and business processes. Hence, it can be easily understood that although all organizations have some common characteristics, no two organizations are identical.

Besides, the interaction between information technology and organizations is very complex and is influenced by a great many mediating factors, including the organization's structure, standard operating procedures, politics, culture, surrounding environment, and management

8

decisions (Laudon & Laudon, 2002: 68). Therefore, the type of organization, policies and strategies, business model as well as organizational goals and objectives are the most important unique features of organizations that should be considered when developing a website.

2.2.1. *Types of organization*

As mentioned above, due to the common characteristics organizations have, they are categorized into certain groups according to their types. Some of the common types are government organizations, non-government organizations, educational institutes, non-profit organizations, associations, United Nations organizations, media organizations, commercial organizations, entertainment organizations and others. For the purpose of this paper the focus will be only on government and media organizations.

2.2.1.1. Government organizations

These organizations are the branches/departments/divisions under a government of any country, such as ministries. These days, many governmental units across the world have embraced the digital revolution and placed a wide range of materials on the web, from publications to databases to actual government services for the use of citizens (Gupta & Jana, 2003). It is believed that e-government can create significant benefits for citizens, businesses, and governments around the world (Jaeger & Thompson, 2003). Hence, electronic government is no longer just an option, but a necessity for countries aiming for better governance (Gupta & Jana, 2003).

2.2.1.2. Media organizations

Media organizations include organizations which provide both newspaper and/or broadcasting services (broadcasting includes radio and television). The main principle of a media organization is to present its audience with news and information. A news web page is one the primary purpose of which is to provide extremely current information (Alexander & Tate, 1999) in terms of articles and advertisements. Thus, most media websites reserve places for advertisement (Greer, 2003), as advertising attracts audience attention and helps to convey information faster. Hence, media organizations need to update their websites on a regular basis and need to be selective with the information they prioritize on their home pages.

2.2.2. *Organizational goals / objectives*

Any organization is expected to have a specific purpose or purposes which should be clearly stated as organizational goals/objectives. When developing a website a short statement identifying two or three of the most important goals should be the foundation of the design (Lynch & Horton, 2002). These goals are the sub-goals of the organizational goals.

2.2.3. *Organizational policies and strategies*

Organizational policies and strategies are important issues concerning business concept of organizations.

2.2.3.1. Kinds of Policy

There can be an international and a nation-wide policy such as the information policy that applies to the whole population of the world or a country. However, policies can be formulated and applied to various groups independently. According to Montviloff (1990:7) an information policy can be formulated at the institutional, national, regional or international level. Sometimes a policy only applies to a specific organization or specific policies can serve specific fields or purposes only. For example James (16:2001) states that different countries will need to develop different responses to the issue of freedom of expression in their policies. Policies should be "flexible, dynamic and responsive to changing circumstances" (James, 2001:1). Hence, policies in different organizations differ as the goals and the social groups of different organizations are different.

2.2.3.2. Instruments of Policy

Policies are embedded in policy instruments and these instruments are legal instruments (constitutions, parliamentary acts, laws, regulations, international treaties, etc.), professional instruments (codes of conduct, professional ethics, etc.) and cultural instruments (customs, beliefs, traditions, social values, etc.) (Montviloff, 1990:7). Traditionally, there are three means of legal protection for intellectual property: patent, trademark and copyright (Rappa, 2003).

2.2.3.3. Importance of policy on websites

The web presents its own unique challenge, not the least of which is the fact that nations differ in their approach to intellectual property law (Rappa, 2003). The Internet has become

10

an unexpectedly popular medium of distribution of copyrightable content, leading to increasing fears among traditional publishers (Van der Merwe, 2000:31). Nowadays, mistaking the free distribution of content with the placement of intellectual property in the public domain is common among web users. But a web page is not public domain material (Rappa, 2003). Property holders can distribute their works freely while retaining their right of control over that work, that is, their copyright (Rappa, 2003).

Trade marks may be registered in one or more of forty two classes, depending upon the goods or services for which protection is sought and different parties for entirely different products or services (Van der Merwe, 2000:51). On the other hand only one domain name can be registered on an Internet domain name space. Often more than one person will have a legitimate claim on the registration of a domain name, but due to the technical requirement that each name must be unique, such registration will be dealt with on a "first come first served" basis (Van der Merwe, 2000:51). A domain name is an important corporate identifier. Beyond being the name under which you send and receive e-mail, like any other trade mark or trade name it can be a symbol of your goodwill and recognition in the marketplace (Van der Merwe, 2000:119). Importantly, when attempting to locate an entity on the Internet, the domain name is often the first component of any search. It is accordingly of vital importance that your domain name reflects your full corporate and/or some or all of your product names, or at least a recognizable part thereof (Van der Merwe, 2000:119).

According to Gupta & Jana (2003) a proper policy framework is vital, especially for government websites. Moreover designers of government websites should develop policies regarding external links from the website, and make it clear when users are leaving the entity's website (Smith, 2001). Various policy instruments support and shape the e-gov concept by seeking to promote the use of new IT by government entities with a view to improving the efficiency and economy of government operations. In addition, they seek to ensure the proper management of these technologies and the systems they serve, their protection from physical harm, and the security and privacy of their information (Relyea, 2002).

2.2.3.4. Strategy

According to Laudon & Laudon (2002:68) it is very important that information technology is aligned with the business plan, but if the business plans, processes and management strategy are all outdated or incompatible with the envisioned technology, then the organization needs

to change to fit the technology or to adjust both the organization and the technology to achieve an optimal "fit'. Hence the organization needs to have a strategy, which is flexible to suit the exact situation. However, frequently systems which were originally intended to be strategic, become tools for survival, something required by every firm to stay in business, or they may even inhibit organizations from making the strategic changes essential for future success (Eardley, Avison, and Powell, quoted in Laudon & Laudon, 2001:68). Hence revising strategy and keeping it always up to date is very helpful for organizations and very necessary during website creation.

Therefore an organization's policy and its specific strategies for acting on every aspect of the policy are very important when deciding what kind of website it needs to develop and use and what information to put on the web and in general how to run and control the website. Hence the creation of a website depends on the specific policy of an organization as well as on a nation-wide policy concerning information, if there is such policy in the country.

2.2.4. *Organizational Business model*

A business model is an abstraction of what product or service is delivered, and how the enterprise delivers the product or service, showing how the enterprise creates wealth (Laudon & Laudon, 2002: 106). Hence organizations need to think carefully about how they can create a genuinely workable business strategy (Chaudhury, Mallick, and Rao, quoted in Laudon & Laudon, 2002: 105).

At this stage of the Internet, there are two categories of business models (Laudon & Laudon, 2002:110). These are the pure play business model and the hybrid clicks-and-mortar business model. The first one is based purely on the Internet. This model is of organizations which did not have an existing bricks and mortar business when they designed their Internet business. The second category is for organizations which have developed websites as an extension of their traditional bricks-and–mortar business. Hence, organizations using the hybrid business model should think of how to incorporate their traditional business with the Internet business to fully satisfy their customers and ensure their competitive power at the global market.

2.3. Inputs required for developing websites

There are basic inputs required for developing a website. These are the resources and infrastructure, budget, and the target audience.

2.3.1. Analysis of existing and required resources and infrastructure

Views on resource allocation during systems development have changed significantly over the years. According to Laudon & Laudon (2002:456) resource allocation determines the way in which costs, time, and personnel are assigned to different phases of a project. Identifying the human and IT resources an organization has and the infrastructure within the organization, as well the country, is vital for website development.

2.3.1.1. Human resources

Identifying the human resources that the organization have in developing a website is very important since it helps the organization to decide whether it is going to be developed by in-house personnel or to be outsourced. Outsourcing can be a good possibility if the potential of the in-house personnel is not sufficient. However, if there are enough human resources within the organization, it will also be necessary to identify the responsibilities of the members of the website development team (Lynch & Horton, 2002).

2.3.1.2. IT resources

The hardware and software capacity of an organization determines what kind of website the organization is able to develop. The first practical question that should be asked when thinking of developing a website is what special technical or functional requirements are needed for the website (Lynch & Horton, 2002). Then analyzing the already existing resources helps to decide whether the website is going to be interactive or not, with lots of graphics and multimedia objects or not. This depends on what tools are developed so far and if they can be afforded by the organization.

2.3.1.3. Infrastructure

The network infrastructure of an organization specifically and the Gateway backbone and ICT infrastructure in a country or region in general, plays a big role in downloading and uploading information to and from the server. Hence, having enough knowledge of how good or bad the infrastructure is, plays role in deciding what kind of website to develop.

2.3.2. Analysis of available and required budget

Since the budget allocated for the project of website development limits the work to be done on the website, it is very important to identify the available budget in the first place. This

budget must include staffing with the highest priority; procurement of technological materials; finance for a consulting and designing company if it is to be outsourced; server rent and maintenance; as well as specific web development costs, such as ISP and hosting fees, clipart and fonts, web reference books and magazines, software, storage media (Brinck, Gergle & Wood, 2002:22); and for evaluation and enhancing. Given the fact that website development is an ongoing process (Lynch & Horton, 2002), the budget needed after the website is published should also be considered.

2.3.3. *Characteristics of target audience*

One of the most important factors when developing a website is to identify and understand the target audience (Brinck, Gergle & Wood, 2002:38). They are the potential readers of the website, so the website design should be structured to meet their needs and expectations (Lynch & Horton, 2002). After all, it is one of the main characteristics of organizational culture. Organizational culture is the set of fundamental assumptions about what products the organization should produce, how and where it should produce them, and for whom they should be produced (Laudon & Laudon, 2002:71).

The objective of any information retrieval system is that it should be used by the group of people for whom it has been designed (Rowley & Farrow, 2000:96). The users' feedback helps develop the usability of a product which is the degree to which specific users can achieve specific goals within a particular environment, effectively, efficiently and comfortably, and in an acceptable manner (Booth, 1989:110 quoted in Rowley & Farrow, 2000:96). It has been recognized by designers that there are different categories of users. Typical categories are: novice, expert, occasional, frequent, children, older, adult and users with special needs (Rowley & Farrow, 2000:96). For the purpose of this study users will be considered in terms of their browsing skills, frequency of visit, location and users with disabilities.

2.3.3.1. Browsing skills

The knowledge, background, interests, and needs of users will vary from tentative novices, who need a carefully structured introduction, to expert "power users" who may get annoyed at anything that seems to patronize them or delay their access to information. A well-designed system should be able to accommodate a range of users' skills and interests (Lynch & Horton, 2002).

2.3.3.2. Frequency

The audience will range from those who will visit the website many times every day to those who refer to the website only occasionally (Lynch & Horton, 2002). This largely depends on the kind of information the website holds.

2.3.3.3. Location

Identifying the locations of the majority of the audience is helpful for becoming conscious of the capacity of data transfer that most users could have. This helps when planning the design of the website, for example, to have as few graphics as possible so that information can be easily downloaded by users with the least bandwidth.

2.3.3.4. Users with disabilities

When developing any website all users must be considered including those with disabilities. Especially government websites must provide accessibility for everyone including individuals with physical disabilities (Kreizman, 2003). The disabilities can be cognitive as well as visual, where visual disability includes both colour blindness and total blindness. However, as remarked by Jaeger & Thompson (2003) the Internet is an environment that is, for the most part, not designed to consider the needs of individuals with disabilities. But the ongoing exclusion of individuals with disabilities from most e-government information and services has the potential to leave a large portion of the world's population unable to access e-government (Jaeger & Thompson, 2003).

Meanwhile Chisholm, Vanderheiden & Jacobs (1999) have come up with some important points to be followed when designing a website which can help the website to be usable even by users with such disabilities. These points are: providing equivalent alternatives to auditory and visual content, not relying on colour alone; using markup and style sheets properly; and clarifying natural language usage. Moreover the following will be useful: creating tables that transform gracefully, ensuring that pages featuring new technologies transform gracefully, ensuring user control of time-sensitive content changes, ensuring direct accessibility of embedded user interfaces, designing for device-independence, using interim solutions, using W3C technologies and guidelines, providing context and orientation information, providing clear navigation mechanisms, and ensuring that documents are clear and simple (Chisholm, Vanderheiden & Jacobs, 1999).

2.4. Challenges when developing websites

An organization can face certain challenges during website development and after it is published. Identifying potential challenges might help an organization to be cautious from the beginning. Although every significant web project can have unique challenges (Lynch & Horton, 2002) the common challenges that could affect most organizations are: competition, diversity of audience and budget and resource limitations.

2.4.1. Competition

This age is an intelligence age where the global competitiveness is crucial for survival (Cook & Cook, 2000:1). Knowing the right things at the right time and acting on them is critical to success. Posting a website can expose information of an organization to its competitors, which they can use to increase their competitive power. Competitors can retaliate and copy strategic systems because competitive advantage isn't always sustainable. Market, customer expectations, and technology changes and the Internet can make competitive advantages disappear very quickly as virtually all organizations can use this technology (Porter, 1990; Yoffie and Cusumano quoted in Laudon & Laudon, 2001:68).

However there is an excellent way to overcome this challenge by applying competitive intelligence. Competitive intelligence (CI) according to Cook & Cook (2002:14) helps an organization to understand the business environment better; learn about its competitor's corporate and business strategies; anticipate a competitor's research development strategies ; reconstruct a competitor's, supplier's or customer's financial, marketing and operational information; forecast opportunities and threats; validate or invalidate industry rumours; create a company information library; plug information leaks within the organization; make effective decisions; and act rather than react.

Furthermore, an organization can use competitive bench marking, a type of competitive analysis, which is a process for measuring performance against those companies that are recognized for excellence in certain aspects of their business (Cook & Cook 2000:14). It is used for comparing the organization's operations with those of the competitors (Malhotra 1996). There are two types of competitive benchmarking: operational and strategic (Cook & Cook 2000:149). Operational benchmarking involves benchmarking specific operations or functions of an organization in an attempt to improve performance in those areas. Strategic benchmarking entails benchmarking corporate or organizational strategy based on contrasting

a best-in-class organization's strategies against one's own organizational strategies. Ideally it is best to perform both types of benchmarking simultaneously to determine why a company is succeeding both at the strategic and operational levels (Cook & Cook 2000:149).

There is a myth that says benchmarking is useful only for businesses. However government organizations and associations can and do benefit just as much from benchmarking, as the private sector does (Cook & Cook 2000:148). Benchmarking can enhance the ability to understand how to improve an organization and change the corporate culture to one that is less inward-focused (Cook & Cook 2000:148). Therefore, by applying benchmarking organizations, and hence their websites, can always ensure their competitive power in the competitive global market.

2.4.2. Diversity of Audience

One of the biggest challenges in web design is developing for the wide diversity of users: user preferences settings; hardware and software platforms; browsers; and network speeds (Brinck, Gergle & Wood, 2002:42); and browsing skills and disabilities. These diverse characteristics of users are the biggest challenge a website developing team must meet to come up with a website that satisfies all of its users at the same time. This challenge can be overcome by studying the target audience carefully beforehand and preparing a well balanced website that accommodates design alternatives, linguistic diversity, browser compatibility (Brinck, Gergle & Wood, 2002:42), both the novice and experts, the connection speed taking the users with the low connection speed to be the benchmark, and using the W3C guidelines for minimizing inconveniences for users with disabilities. Moreover if the website is targeted to international users then international differences such as cultural, language, measurement units, symbols, currency, time and date format, and conventions for all sorts of things should be taken into consideration (Brinck, Gergle and Wood, 2002:51).

2.4.3. Limitations

Limitations in resources and infrastructure, policy and budget will also be a great challenge for an organization during website development.

2.4.3.1. Resources and Infrastructure

Human as well as technological resources are two interdependent capabilities. It can be very frustrating when the ability to come up with brilliant innovative ideas is limited while the

technological resources exist. There are three key staffing challenges, finding people with the right skills; having those people available when you need them; and forming successful teams of people who work together well (Brinck, Gergle & Wood, 2002:24).On the other hand if there are ideas, the conversion of the ideas into a usable electronic product will be far from easy, if there are not enough technological resources. A limited infrastructure has a similar effect, as there can be a bottleneck when uploading and downloading pages when the website is published on the Internet.

2.4.3.2. *Budget*

Budget constraint is a big challenge in many ways during website development. A website development team will need salaries, and even more funds will be needed if the website is going to be produced by an outside company. However, technological limitations can be easily avoided if an adequate budget is allocated to the website. Moreover, producing a website is an on-going process that needs continuous backing for long term editorial personnel, web server rent and maintenance (Lynch & Horton, 2002).

2.4.3.3. Policy and its instruments

If an organization does not have clear policies concerning its business and specifically its use of information, it will be very difficult to develop a website. Besides, the policy of an organization always needs to be based on the nation-wide information policy. In fact, for a policy to be adequate it also needs sufficient policy instruments such as legislations and ethical codes.

The development of the Internet was seen by many as the beginning of the end for intellectual property rights where technology develops too fast for the law in this area (Buys, 2000:37). The main problem is the international character of the Internet whereas intellectual property regulation can vary from nation to nation. According to Buys (2002: 37) each country has its own laws regulating copyright, trademarks, patents, designs and trade names, but anyone who publishes on the Internet could be infringing on intellectual property rights (or other rights and laws) anywhere in the world .

Although there are some international conventions and agreements concerning intellectual property rights such as copyright, trademarks and patents, they are not yet fully developed to

thoroughly protect electronic works such as websites (Buys, 2000:37).Hence, the fact that policy instruments are not fully developed poses a challenge during website development.

2.5. Conclusion

Developing a website for an organization is a task that needs lots of planning and the consideration of many internal and external factors of the organization. It is essential to have clearly specified goals, policies and strategies, and enough resources to create a high-quality website. However, it is very challenging both during the website development and after it has been published and is functional. The most common problems are competition, diversity of users, budget constraints, and the inadequacy or incompatibility of international and national legislation that are essential for protecting intellectual property rights and privacy rights.

Hence when planning to develop a website one must consider all the factors that can basically affect it in any way and to plan the website in a manner to minimize risk. It helps for an organization to be proactive and be prepared for any consequence that could occur, before revealing its information to everybody through the Internet. Therefore by approaching the website from different perspectives: from the perspective of users and competitors, one can come up with an excellent website plan that paves the way to high user satisfaction as well as ensuring a sustainable competitive power for the organization.

2.6. Summary

This chapter discusses how the business concept of the organization, inputs required for developing websites and challenges that organizations face during the process are important when creating a website. The first thing that needs to be considered is the business concept of the organization because all organizations have unique features although they also have some common features as well. Features that make organizations unique are the type of organization, organizational goals/objectives and the organizational business model. In addition all inputs for the web development need to be considered. These are the existing and required resources and infrastructure, budget, and the characteristics of the target audience. Most importantly, possible challenges such as competition, diversity of audience and limitations when developing websites must to be identified. Therefore, all the factors that have impact on the website must be considered first when planning to develop a website.

3. Chapter Three

The website development process

3.1. Introduction

At the initial stage of creating websites, organizations need to identify their policies, strategies, goals, business models , resources, infrastructure, inputs available and required that could support their web developing projects. Although they are faced with different challenges during their web development process, they need to be aware of the challenges and plan accordingly in order to overcome them.

Developing a website, especially a large website, is a process that may have far-reaching budgetary, personnel, and public relations consequences for an organization, both during the initial stage of the website development and long after its successful deployment (Lynch & Horton, 2002). According to Lynch & Horton (2002), every significant web project poses unique challenges, but the overall process of developing a complex website generally follows six major stages. These stages are the website definition and planning, information architecture, website design, website construction, website marketing and website maintenance. However the design critique, website specification and testing are also important processes that need to be included as the first two stages of the development process. Hence, nine development processes will be discussed in this chapter.

3.2. Design critique

The goal at this stage is to identify potential successful models in other websites and to begin to see the design problem from the website user's point of view (Lynch & Horton, 2002). A critique meeting is focused on evaluating a set of existing ideas, and possibly identifying future directions or changes, unlike a brainstorming meeting, where the exclusive goal is to come up with new ideas (Berkun, 2003). Each member of a website development team will bring different goals, preferences, and skills to the project.

Group critiques are a great way to explore what makes a website successful, because everyone on the team sees each website from a different user's point of view (Lynch & Horton, 2002). In a group critique each team member brings a list of a few favorite websites to the critique, and introduces the websites and comments on the successful elements of each design. This includes what categories, labels, icons, processes, and features are being used on other similar

websites (Brinck, Gergle & Wood, 2002:84). In this way the team members will learn one another's design sensibilities and begin to build consensus on the experience that the target audience will have when they visit the finished website (Lynch & Horton, 2002).

The typical goals of a design critique are: to obtain specific kinds of feedback from those in the room about a set of different design approaches for one feature or area of a website; to compare how several different components of the same product are designed; to discuss the user flow through a design, by examining each screen in the sequence that users would go through to complete a task; and to explore the designs of competing products, or designs of other products that have elements or qualities that the website wants to achieve (Berkun, 2003). This is done by allowing team-mates with different job functions to provide feedback from their expertise (Berkun , 2003).

3.3. Website definition and planning

This is the initial stage where goals and objectives for the website are defined, where the collection and analysis of the needed information is begun, and budget and resources required are justified (Lynch & Horton, 2002). This is also the time to define the scope of the website content, the interactive functionality and technology support required, and the depth and breadth of information resources that are needed to fill out the website and meet readers' expectations. If the production of the Website is to be outsourced, selection of a design firm is done at this stage as the website designers should be involved in the planning discussion (Lynch & Horton, 2002).

There are certain things that must be considered when defining and planning a website. These are the production, technology, web server support, budget and the appointment of a website editor.

3.3.1. Production

This includes how the website production team is composed , whether it is composed of in-house people, outside contractors, or a mix of the two; will there be a process manager, content experts, liaison to any outside contractors, long-term webmaster or senior website editor (Lynch & Horton, 2002) and so forth.

3.3.2. *Technology*

This includes the browsers and operating systems the website supports, network bandwidth of average website visitors, dynamic HTML and advanced features, contacts to support personnel (through e-mail, chat rooms, forums, help desks, or phone support), database support, and audiovisual content (Lynch & Horton, 2002).

3.3.3. Web server support

This includes whether the web server is in-house or outsourced to an ISP, availability of unique domain names (multihoming), disk space or website traffic limitations or extra costs , adequate capacity to meet website traffic demands, 24/7 support and maintenance, statistics on users and website traffic, server log analysis (in-house or outsourced), search engine suitable for the content of the website, CGI programming, and database middleware support available, database support or coordination with in-house staff (Lynch & Horton, 2002).

3.3.4. Budgeting

This includes the budget for salaries for short-term and long-term staff, hardware and software for the in-house development team, staff training in web use, database, web marketing, and web design (Lynch & Horton, 2002). Also budget for outsourcing fees for website design and development, ongoing personnel support for the website, such as a website editor or webmaster, ongoing server and technical support, database maintenance and support and for new content development and updating (Lynch & Horton, 2002).

3.3.5. Appointing a Website editor

A website that is "everyone's responsibility" can quickly become an orphan (Lynch & Horton, 2002). Hence, to maintain consistent editorial, graphic design, and management policies one person is needed to act as the editor of the overall website (Lynch & Horton, 2002). However, the website editor's duties can vary from doing all the work of maintaining the website content to coordinating and editing other contributers' work (Lynch & Horton, 2002). High-profile public pages or pages that contain very important content should be vetted by the editor before public posting.

In addition to ensuring editorial quality, a website editor must also make sure that the content of the website reflects the policies of the organization, is consistent with local appropriate use policies, and does not contain material that violates copyright laws (Lynch & Horton, 2002).

3.4. Website Specification

A website specification is a proposal outlining the scope of the project, including responsibilities, timelines and costs (Alexander, 2004). A well-written website specification is a powerful daily tool for judging the effectiveness of a development effort (Lynch & Horton, 2002). It provides the team with a compass to keep the development process focused on the ultimate purposes of the website.

The finished website specification statement must contain the goals and strategies (Lynch & Horton, 2002; Brinck, Gergle & Wood, 2002:64). These are: the mission of the organization; how creating a website can support the mission; the two or three most important goals for the website; the primary audience for the website; anticipation of what the audience may think or do after having viewed the website; web-related strategies that will be used to achieve the goals; success measurement and how to maintain the finished website adequately.

Moreover it should also contain production issues such as the estimated number of pages the website contains; the maximum acceptable count under the allocated budget; what special technical or functional requirements are needed; what the budget for the website is; the production schedule for the website, including intermediate milestones and dates; and the people or vendors on the development team and what their responsibilities are (Lynch & Horton, 2002). Scheduling during web development is an extraordinarily dynamic process which needs preparation beforehand for any change (Brinck, Gergle & Wood, 2002:26).

3.5. Information architecture

Information architecture refers to the structure or organization of the website, especially how the different pages of the website relate to one another (Brinck, Gergle & Wood, 2002:120). The challenge becomes how to organize, categorize, manage, deliver and present content effectively and securely so that consumers see what they want as well as when and where they need it, using the most effective presentation methods (Content management lifecycle and effective online relationship, 2002). The architecture for a website is the result of taking all the materials and organizing them into a structure that helps the user navigate efficiently (Brinck, Gergle & Wood, 2002:130). Information architects need to be involved only during website redesign in smaller websites, but they are always needed and can be employed during the website's entire life in big websites (Rosenfeld & Morville, 2002:17).

At this stage the content and organization of the website needs to be detailed. Information architecture is organizing a huge amount of information on big websites and intranets so that people can actually find what they are looking for. So it means making it easy for customers to find products on websites, considering the information overload problem (Rosenfeld & Morville, 2002:8).

3.5.1. Means of organizing websites

The website development team should inventory all existing content, describe what new content is required, and define the organizational structure of the website (Lynch & Horton, 2002).

Web content management becomes important at this stage. It is essential to make the website "easy" for non-technical participants to publish content actively to the web by providing friendly tools to do so and removing the bottlenecks that can occur between webmaster and content contributor (Guenther 2001). A well chosen web content manager combined with effective processes for managing the website should result in fewer technical staff to manage the website (Guenther 2001).

For example, metadata would document data about data elements or attributes (names, size, data type, etc.) and data about records or data structures (length, fields, columns, etc.) and data about data (where it is located, how it is associated, ownership, etc.). Metadata may include descriptive information about the context, quality and condition, or characteristics of data (Rosenfeld & Morville, 2002:176). Adding a search facility to a website and associating the search box with the search engine is part of information architecture (Rosenfeld & Morville, 2002:132). When writing metadata, questions to be asked are: what is this object, what distinguishes this subject from others, how can I make this object findable (Rosenfeld & Morville, 2002:223). Therefore, information architecture is an ongoing process (Rosenfeld & Morville, 2002:304).

3.5.2. Those responsible for information architecture

Journalists are trained at organizing information. Hence if the website is geared towards delivering dynamic information, such as a news service or online magazine someone with a background in journalism might have a great sense of how information could be best organized and delivered (Rosenfeld & Morville, 2002:19). In addition, people with a

background of graphic design and information design, information and library science, usability engineering, marketing, computer science, technical writing, architecture, product management and so on are candidates to be information architects (Rosenfeld & Morville, 2002:19/20).

At this stage the detailed website design specification, detailed descriptions of website content, website maps, thumbnails, outlines, table of contents; detailed technical support specification, browser technology support, connection speed support, web server and server resources could be included. Also, proposals to create programming or technology to support specific features of the website, a schedule for implementing the website design and construction, one or more website prototypes of multiple pages, multiple graphic design and interface design sketches or roughs can be prepared (Lynch & Horton, 2002). Labels in the navigation bar are also identified by an information architect (Rosenfeld & Morville, 2002:12).

Once a content architecture has been sketched out, small prototypes of parts of the website should be built to test what it feels like to move around within the design (Lynch & Horton, 2002). Website prototypes are useful for two reasons namely to test website navigation and to develop the user interface. Besides, prototypes allow graphic designers to develop relations between how the website looks and how the navigation interface supports the information design.

3.6. Website design

At this stage the project acquires its look and feel, as the page grid, page design, and overall graphic design standards are created and approved (Lynch & Horton, 2002). The illustrations, photography, and other graphic or audiovisual content for the website needs to be created and research, writing, organizing, assembling, and editing the website's text content is also performed in the website design stage (Lynch & Horton, 2002). In addition, any programming, database design and data entry, and search engine design should be well under way.

According to Guenther (2002), one of the many challenges of managing and developing a large website is trying to facilitate the adoption of standards both for navigation, branding, "look and feel", content quality, and for back-end programming of web pages. Regardless of whether you choose front- or back-end standards, your choice should allow everyone

contributing to the website to follow a similar plan. The goal is to produce all the content components and functional programming and have them ready for the final production stage which is the construction of the actual website pages (Lynch & Horton, 2002).

At this stage components of content are expected to have detailed organization and assembly. These consist of edited and proofread texts; graphic design specifications for all page types which includes finished interface graphics for page templates as well as header and footer graphics, logos, buttons, backgrounds; detailed page or finished examples of key pages; a website graphic standards manual for large and complex websites; interface design and master page grid templates completed; finished HTML template pages; illustrations and photography (Lynch & Horton, 2002).

Moreover, all the functional and logical components are expected to be prepared at this stage. This includes the designing of JavaScript, Java applets, database tables and programming, completion of interaction prototypes, search engine designing and testing (Lynch & Horton, 2002). All the details of the website are expected to be prepared by the end of this stage.

3.7. Website construction

The developer may need to interact with the designer in order to understand the design and the navigation (Alexander, 2004). At this mature stage of the project the bulk of the website's web pages are constructed and filled out with content prepared at the previous stage. By waiting until you have a detailed website architecture, mature content components, and a polished page design specification, the content churning, redundant development efforts, and wasted energy that inevitably result from rushing to create pages will be minimized (Lynch & Horton, 2002).

Begin by building website templates and then add the content that has been gathered (Lynch & Horton, 2002). It's much easier to add new pages if you can start from a page that already has the basic navigation and website graphics in place. Make sure to include consistent navigation links throughout the website and be prepared to refine the designs when navigating through the growing website and discovering both weak spots and opportunities to improve navigation or content (Lynch & Horton, 2002).

Once the website has been constructed, with all pages completed and all database and programming components linked, it is ready for beta testing (Lynch & Horton, 2002). Testing

should be done primarily by readers outside the website development team who are willing to supply informed criticism and report programming bugs, typographic errors, and critique the overall design and effectiveness of the website. Fresh users will inevitably notice things that the development team have overlooked. It is after the website has been thoroughly tested that publicizing the URL address of the website to a larger audience should be begun(Lynch & Horton, 2002).

At the end of this stage the HTML for all web pages should be finished with all page content in place; navigation link structure must be finished; all programming and databases should be in place and linked to pages, ready for beta testing, all graphic designs, illustrations, and photography should be in place. Besides, final proofreading of all website content, detailed testing of database and programming functionality, testing and verification of database reporting features, testing of website reader support procedures such as answering email, archives of all website content components, html and programming codes, and any other website development materials should be in place (Lynch & Horton, 2002; Alexander, 2004).

3.7.1. Creation of styles

Cascading style sheets are one of the greatest hopes for recapturing the web's ideal of the separation of presentation and content. One of the main benefits of style sheets is to ensure visual continuity as the user navigates the website. Websites will gain the same brand cohesiveness (text and basic layout look the same) when all the pages on a website link to the same style sheet (Nielsen, 2000a:81).

Cascading web style sheets means the website's style sheet is merged with the user's style sheet to create the ultimate presentation. Web is not WYSIWYG (What you see is what you get) because of the variability in supported platforms (Nielsen, 2000a:82).However, the style sheet should come with a small manual that explains the different styles, as well as when and how to use them (Nielsen, 2000a:83).

If a website is to be developed by an outside developer, it is crucial to understand how the developer writes code, in what state the code will be when the website is delivered, and whether the software used by the developer is compatible with what you will be using to maintain the website after delivery (Lynch & Horton, 2002). Checking the code and making sure that the developer inserts explanatory comments and dividers for legibility in the code are very important. Be sure to check if there will be any problems or conflicts in using the

favourite web tools to edit the html code your web developer produces (Lynch & Horton, 2002).

3.7.2. Complying with accessibility guidelines

It is important to ensure that page designs work across a wide range of platforms and that they can be accessed by people who use older technology as well. It is also important to make the page design work on small monitors and have acceptable response times when using analogue modems (Nielsen, 2000a:97). It is best to design a resolution-independent home page, which can adapt to various screen sizes (Nielsen, 2000a:174).

3.8. Website testing

Web based applications need intensive testing, as the applications will always function as a multi-user system with bandwidth limitations. Some of the testing which should be done are, integration testing, stress testing, scalability testing, load testing, resolution testing and cross-browser compatibility testing (Alexander, 2004). It is necessary to test graphics loading and to calculate their loading time, as they are very important for any website (Alexander, 2004). After doing all the above mentioned tests a live testing is necessary for websites and web based applications. After uploading the website there should be a complete testing such as a links test (Alexander, 2004).

3.9. Website marketing

Any website, after being constructed and published, should be advertised, because users need to know that it exists in order to use it. Hence, the new website should be an integral part of all marketing campaigns and corporate communications programs, and the URL for the website should appear on every piece of correspondence and marketing collateral an organization generates (Lynch & Horton, 2002).

If the website is aimed primarily at international audiences getting listed in standard web indexes, such as Yahoo and Infoseek, will give the audience some information about it (Lynch & Horton, 2002). On the other hand, if the website is aimed primarily at local audiences, the URL should be publicized in places where local residents or businesses will encounter it, such as local libraries or schools where the content is relevant (Lynch & Horton, 2002).

There may also be opportunities to cross-promote a website with affiliated businesses, professional organizations, broadcast or print media, visitor or local information agencies, real estate and relocation services, Internet access providers, and local city or town directory websites (Lynch & Horton, 2002). Common website marketing methods are that the home page URL appears in all print advertisements, radio and television advertisements, lobby kiosks in high-traffic areas of the enterprise or in local libraries, schools, or other suitable venues, direct mail campaigns, business cards stationery, bills and statements, product manuals and product packaging, response cards and warrantee cards, publications and promotional materials, press releases, posters and billboards (Lynch & Horton, 2002).

The website promotion is normally an ongoing process as the strategies of the search engine may change quite often. Submitting website URLs once in 2 months can be an ideal submission policy (Alexander, 2004).

3.10. Website maintenance

A website should not be abandoned once it is published. Regular follow-ups need to be done to keep the design, navigation, and contents of the website well preserved through out the life of the website.

3.10.1. Maintaining the website

The aesthetic and functional aspects of a large website need constant attention and tidying up, particularly if a group of individuals share responsibility for updating the content (Lynch & Horton, 2002). Someone will need to be responsible for coordinating and vetting the new content stream, maintaining the graphic and editorial standards, and ensuring that the programming and linkages of all pages remain intact and functional (Lynch & Horton, 2002). Links on the web are perishable, and it is necessary to check periodically that links to pages outside the immediate website are still working (Lynch & Horton, 2002).

Websites will need frequent updating to keep them very fresh. The analysis must be done again and all the life cycle steps must be repeated. Bug fixes can be done during the time of maintenance. Once your website is operational, ongoing promotion, technical maintenance, content management & updating, website visit activity reports, staff training and mentoring is needed on a regular basis, depending on the complexity of your website and the needs within your organization (Alexander, 2004).

3.10.2. Backups and website archives

The website editor should be sure that the Website is regularly backed up onto a secure and reliable storage medium to ensure that a catastrophic hardware failure in the web server does not wipe out the website (Lynch & Horton, 2002). Most web servers maintained by information technology professionals or commercial Web service providers are backed up at least once a day.

If the website is successful, it will quickly become an important record of the enterprise's work, accomplishments, and a valuable record of the "state of things" as the website evolves over time. Unless the website is prohibitively large, the website editor could arrange to collect and store the files of the website periodically or contract with the web service provider to set aside a backup version at regular intervals so that it can be archived for long-term use (Lynch & Horton, 2002).

A website requires constant checkups to make sure that every item is working perfectly and it also needs a backing-up and archiving system for long term use of contents.

3.11. Conclusion

There are nine stages in the website development process. These stages are very important and therefore any website should pass through each of them during the time of development. Firstly, after assessing what capabilities an organization has to produce a website, a design critique is done to gather information of how similar websites are designed. Then follows the website definition and planning where everything needed for the website will be precisely put into website specification in an easily understandable way. After that the actual information gathering, creating, organizing and website construction follows.

The website needs to be tested before it is put onto the Internet and then it should be advertised well through other websites, books, radio, tv, etc, or submitted to search engines, and the home page URL should be published in everything concerning the organization. This is because if nobody knows that such a website exists, it is not going to be used, which makes all the effort of publishing the website fruitless. Besides the website must always be maintained on a regular basis. Therefore, since technology is developing so fast, creating a website should not be a once-off process, but it should be checked regularly, modified and updated following the steps all the way from stage one .

The following figure shows how the nine web development processes have an endless cycle when websites are continuously evaluated and updated regularly. Evaluation of websites will be discussed in the next chapter.
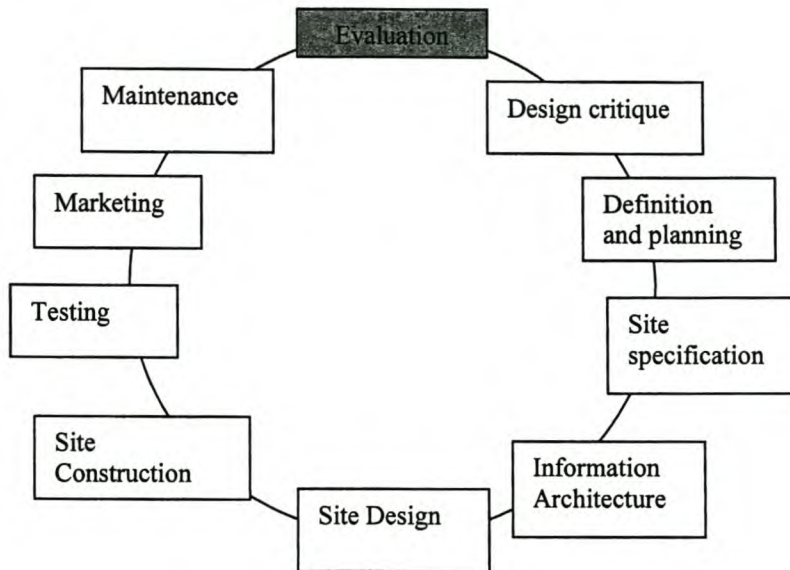
Figure 3:1   Web development process

Source: Adapted from Alexander (2004)

3.12. Summary

Every website development process faces its own unique challenges due to the different purposes of the website, type of organization, policy and objectives, available resources and limitations, as well as type of audience. However, there is a basic process that each and every website should go through. This process includes the design critique, website definition and planning, website specification, information architecture, website design, website construction, testing, website marketing and website maintenance. At the initial stage several ideas from already developed similar websites are identified and are discussed by the development team. Besides the scope of the website content, the interactive functionality and technology support required, and the depth and breadth of information resources that are needed to fill out the website and meet reader's expectations need to be well defined and planned. A detailed specification that consists of the organization's mission statement, goals of developing the website, primary audience, and other important information such as the task and time frame of the web development project, that can be used as point of reference should be well prepared. Contents need to be well researched, organized and well presented.

31

Besides, the contents (text, graphics as well as databases) of the website should have originality and needs to be copyright protected. When everything is ready codification is done so that the contents can be browser readable. After the website construction is finished and the website is tested to be working properly, it should be marketed/advertised at every available opportunity to attract users' attention to the new website. Finally regular follow-ups and maintenance will keep the website healthy and prolong its life.

4. Chapter Four

Evaluating the usability of websites

4.1. Introduction

> "I know not any thing more pleasant, or more instructive, than to compare experience with expectation, or to register from time to time the difference between idea and reality. It is by this kind of observation that we grow daily less liable to be disappointed."

Johnson: Letter to Bennet Langton

Any newly designed thing needs to be evaluated in order to ascertain to what extent the designed product satisfies its users. Besides a product can look as if it is designed perfectly but its functionality might not be as planned or expected for some internal or external reason. Therefore to avoid or minimize such mal-functionality products should be evaluated and modified.

In the case of some products such as websites and other highly technical products, evaluation needs to take place not only the first time but also regularly from time to time. This is important because, due to the high technological advancement what looks best today may be outdated in few weeks' time. In fact, a web year is six to nine weeks (Rowley and Farrow 2000:11). Hence, a website should not be abandoned once it is published. Regular follow-ups need to be done to keep the beauty, navigation, and contents of the website well preserved throughout the life of the web-website.

The important issues to be discussed during website evaluation are: reasons for performing the evaluation, criteria of evaluation as well as the techniques of evaluation.

4.2. Reasons for evaluating websites

The first question that should be asked before spending time, money and effort on evaluation is "Why do we need to evaluate a website?"

A website should not be abandoned once it is published. Regular follow-ups need to be done to keep the design, navigation, and contents of the website well preserved throughout the life

of the web-website. In order to preserve its good qualities and to improve its weaknesses, assessment is necessary that can identify even the slightest inaccuracy. If any website is successful it will have to be genuinely useful to the target audience, meeting their needs and expectations without being too hard to use (Lynch & Horton , 2002). Moreover, how a website is designed affects the user experience in other ways besides usability. These other aspects are the brand recognition, organizational image, aesthetics, and trust (Johnson, 2003 :4).

Usability is the quality of a system that makes it functionally correct, easy to learn, efficient to use, easy to remember, error tolerant, and subjectively pleasing (Brinck, Gergle, & Wood, 2000:2). Usability is important for both users and developers. For users, it makes the difference between performing a task accurately and completely or not, and enjoying the process or being frustrated; while from the developer's perspective it makes the difference between the success or failure of a system (Brinck, Gergle, & Wood, 2000).

We can learn to be better user interface designers by learning design principles and design guidelines, but this doesn't mean that we can create a highly usable system without getting information from the users of the website (Brinck, Gergle, & Wood, 2000:15). Involving real users during website development, listening and responding to what users say, testing designs with users, and keeping the website easy to use, makes the project of creating a website successful (Lynch & Horton , 2002). However, although the people who will actually use the website will determine whether the project is a success, ironically, those very users are the people least likely to be present and involved when the website is designed and built (Lynch & Horton , 2002). Hence, feedback from users during the development process and for evolutionary refinement can provide useful insights and guidance (Shneiderman, 1987:32).

The key principle for maximizing usability according to Brinck, Gergle, & Wood (2000:16) is to employ iterative design, which progressively refines the design through evaluation from the early stages of design. The evaluation steps enable the designers and developers to incorporate user and client feedback until the system reaches an acceptable level of usability (Brinck, Gergle, & Wood, 2000).

Evaluation of websites helps developers to distinguish between individual differences among the users of a website (Shneiderman, 1987:23,25). These differences could be in cognitive and perceptual abilities, in personality, culture, ethnic, racial or linguistic background. Moreover,

34

an evaluation of designs refines the understanding of the appropriateness of each choice (Shneiderman, 1987:9). Multiple design alternatives must be evaluated for specific user communities and for specific benchmark sets of tasks. This is because a clever design for one community of users may be inappropriate for another community and an efficient design for one class of tasks may be inefficient for another class (Shneiderman, 1987:11).

Successful websites and web based applications require user-centered, task-focused design of the back-end systems and the website itself (Johnson, 2003 :4). Hence some faults could be not from poor design of the web, but from faults of the back end: server-side applications, servers and databases upon which the website depends (Johnson, 2003:4).

Therefore the purpose of evaluating websites can be generalized into five points. These are to test their usability, to test if they are promoting the intended message properly, to check if the design is still attractive, to ensure the competitiveness of the website, and to check the front-end and back-end interaction.

4.3.   Evaluation criteria

Usability, which usually refers to software where it is relevant to any product (Brinck, Gergle, & Wood, 2000), can be improved by shortening the time to accomplish tasks, reducing the number of mistakes made, reducing the learning time, and improving people's satisfaction with a system.

There are five helpful usability profiles obtainable from the WAMMI Web Usability Questionnaire. They are the attractiveness, control, efficiency, helpfulness, and learnability (WAMMI: Web Usability Questionnaire). However, Nielsen (quoted in Johnson, 2003:13) remarked that people usually visit your website for its content. Hence content is most important on a website, although it is difficult to get people to look at something if it is not well organized, unattractive (De Klerk, 2001:24), not efficient, not helpful, not easily learned and controlled. Thus, the evaluation criteria for websites in this study can be classified into eight interdependent categories. These are the quality of content, content organization, attractiveness, user control, efficiency, helpfulness, learnability, and accessibility.

4.3.1. Quality of content

Usually people visit websites for their content not their beauty. This is because content is the most important part of any website where information useful to users is held. Information on a

website can make or break the website (Johnson, 2003:19) and hence the quality of the information is very important for the website's credibility. Users evaluate contents in terms of five basic criteria. These are the accuracy and authority, objectivity, currency, coverage, and writing style.

- **Accuracy and Authority**: - The first and most important is checking for accuracy: if the page lists the author and institution that published the page and provides a way of contacting the author and if it lists the author's credentials (Kapoun, 1998; Buning, 2000).

- **Objectivity**: - Users check if the page provides accurate information with limited advertising and if it is objective in presenting the information (Kapoun, 1998).

- **Currency**: - Another important thing is to check if the page is current and updated regularly and if there are any links they should also be updated (Kapoun, 1998; Buning, 2000; Johnson, 2003: 28). Outdated content is a sure way to lose credibility (De Klerk, 2001: 32).

- **Coverage**: - Check if the website includes more information than other similar websites and covers relevant topics best. Missing, unfinished or useless content should not be posted (Johnson, 2003:35-37). The very best solution is to add whatever people are looking for, so that the website can satisfy the major user needs regarding contents (De Klerk, 2001: 27).

- **Writing style:** - Spelling and grammar errors should be avoided (Johnson, 2003:217). Moreover, keep in mind when writing and editing, that visitors of websites are international readers (De Klerk, 2001: 70). This thought will help you to avoid slang (Godsborough, 1993 quoted in De Klerk, 2001: 67) and jargon and remind you to use vocabulary based on users not on experts in your website's business. In addition vocabulary used should be consistent not variable and address users as members or customers throughout the website instead of as users. Use customer - focused language, use consistent capitalization and other style standards, avoid redundancy, avoid exclamation marks and the use of uppercase letters (Nielsen & Tahir, 2002:15). The requirements for online headlines are very different from printed headlines because they are used differently (De Klerk, 2001: 63). The difference is that online headlines should stand on their own and make sense when the rest of the content is not available because they are the ones which are listed in a search engine hit list, browsers bookmark or e-mail messages (De Klerk, 2001: 63). People must understand the content from the headline and decide if they want to read the details. Avoid beginning headlines with articles like "The" and "A" otherwise, they will be categorised under "T" and "A" which has nothing to do

with the content (De Klerk 2001:64). Headlines, especially for news and press releases, should be to the point, yet descriptive, to give maximum information in as few words as possible (Nielsen & Tahir, 2002: 27). Use the pyramid, a technique from news journalism: offer a summary of your story at the beginning and expand from there (Whittaker, 2002:117).

Therefore content in websites should be accurate and authoritative, with clear objectives, timely, have good coverage and be written in user focused suitable style.

4.3.2. Content Organization

Information or content organizing involves grouping information components into meaningful and distinctive categories (Rosenfeld & Morville, 2002: 5). It strongly affects navigation and the schemes used to categorize and classify products or services (Johnson, 2003:19). As discussed in the previous chapter, content organization is one of the big components of information architecture as it is the fifth stage when developing websites. Information architecture includes the organization, labelling, navigation and searching system (Rosenfeld & Morville, 2002: 46) where the navigation and searching depends on how information is organized and labelled.

The exponential growth of the Internet is a big challenge to how contents on the Internet is organized (Rosenfeld & Morville, 2002:51) and it has become a major factor in determining success. Manual indexing or metadata tagging is ultimately a tool for organizing content items into groups at a very detailed level (Rosenfeld & Morville, 2002: 55). Making it easy to access anything that has been recently featured on the homepage, for example, in the last two weeks or month, by providing a list of recent features as well as putting recent items into a permanent archives section like in USA TODAY.com (Nielsen & Tahir, 2002: 17) is also a good organization of previous contents.

Categories are easy when they are organized hierarchically and are independent, mutually exclusive, and exhaustive (Johnson, 2003:22). However, most of all the home page's contents should be organized in such a way that they attract visitors' attention, and should allow visitors of the website to determine the website's purpose in a quick scan of the page (Johnson, 2003:13). In addition, the most critical page elements should be visible "above the fold" (in the first screen of content, without scrolling) at the most prevalent window size (Nielsen & Tahir, 2002:23; Brinck, Gergle & Wood, 2002:207).

4.3.3. Attractiveness

As mentioned above nobody will be interested in reading the contents of a website if it is not attractive. In fact, a simple-to-use website will seem attractive to users (De Klerk, 2001: 43). The colour accuracy, image quality, text layout and alignment of elements are important factors for a website to be attractive.

It is recommended that high-contrast text and background colours should be used so that type is as legible as possible (Nielsen & Tahir, 2002:23). In fact, using white background colour and black body text gives the maximum possible contrast and the highest possible readability. A white background is the simplest and usually the best especially when coupled with black or very dark text (Nielsen & Tahir, 2002:51). Using white space properly (De Klerk, 2001: 59) will make a website eye catching. Moreover, making great distinctions between links and non-links and underlining links with blue will make a website attractive (Johnson, 2003:222-238).

On the web, logos play a vital role. They often serve as the main graphic heading on the page and consequently are the visual centre of the entire page design (De Klerk, 2001: 83). Hence designing a logo which is very expressive as well as attractive, is as important as the content quality to any website. But, logos should be used sensibly (Nielsen & Tahir, 2002:2). Many government agencies design logos for each new initiative or program which must be kept for internal use only (Nielsen & Tahir, 2002:2).

Using less text (Nielsen, 2002) and avoiding an inconsistent style of texts(Johnson, 2003:196-214) can make a website attractive to the readers. Tiny text or camouflaged text in patterned background and poor contrast between texts and background make a website unattractive; therefore it is advisable to avoid them (Johnson, 2003:246-258). Centering everything is not advisable; in fact aligning text to the left is preferable (De Klerk, 2001: 56).

Using a liquid layout with variable width is recommended because web pages automatically adapt to the size of the user's browser window without displaying huge amounts of wasted white space in large windows (Nielsen & Tahir, 2002:23/40; Brinck, Gergle & Wood, 2002:203)

4.3.4. User control

Give a user full control and freedom when visiting the website by reducing system complexity and user frustration and expanding functionality (Shneiderman, 2001). This can be achieved by facilitating access to users who need support because of visual, auditory, physical, and other disabilities; and enabling multilingual, multiplatform designs for diverse users (Shneiderman, 2001). Users who prefer to read hard copies should be provided with an easy way to print related sets of pages (De Klerk, 2001: 71).

When users are asked to supply information, redundant requests for information due to loss of data on the return page or asking users to log-in should be avoided. Offering pointless choices such as choice for pages which are still under construction (Johnson, 2003:44-57) should also be avoided. These problems are usually difficult to correct since they are often caused by poorly designed back-ends- services and databases on which the website depends or by faulty interaction and communication between the back-end and the front-end, especially in large organizations, since most of the time the front-end and the back-end are developed by different groups (Johnson, 2003:44). In addition, including all important options and avoiding dead end paths (Johnson, 2003:62-72) are important.

Also avoid horizontal scroll because users don't notice the scrollbar and miss seeing content that is scrolled off the screen (Nielsen & Tahir, 2002:23).

4.3.5. Efficiency

Since users need web pages to load quickly, the image files need to be made as small as possible because website file-size problems are generally due to the use of graphics (De Klerk, 2001: 31). Limiting the size of individual images to 5k, and the total size of all pages to10-20k is recommended. Because GIFs are usually smaller than JPEGs, using GIFs whenever possible is advisable (De Klerk, 2001: 72, Whittaker, 2002:65). As a general rule of thumb, it is recommended to allocate only 5-15 % of the homepage to images (Nielsen & Tahir, 2002:49). After all bigger size means slower download (De Klerk, 2001: 31). Consequently the usage of thumbnails makes download faster than using big photos. When using small decorative graphics for icons or buttons it is advisable to use the same repeatedly since it will only be downloaded once to the PC and will be kept in the cache memory which speeds up download (Nielson, 2000:46).

However, if the homepage is slow, users quite reasonably conclude that the rest of the website will also be slow and painful to use, and they are likely to abandon the website completely (Nielsen & Tahir, 2002:39). Moreover the use of audio, video or animation delays the speed of the website. The capability of the server the website resides on, traffic volume on the Internet at the time the website is visited, and the capabilities of the website's visitor's computer and modem (De Klerk, 2001: 32; Nielsen & Tahir, 2002:39) also contribute a great deal on the speed of downloading of a website.

Hence, the download speed of web pages, especially of the homepage, should be as fast as possible.

4.3.6. Helpfulness

A website should have features that will help users find what they are looking for easily and comfortably.

4.3.6.1. Website recognition

Most of all placing the name of the company and logo on every page (Nielsen quoted in De Klerk, 2001: 56) helps visitors to know which website they are in, even if they came from a link on another website or search engine. Making the logo a link to the home page will be more helpful (Brinck, Gergle & Wood, 2002: 164; Nielsen quoted in De Klerk, 2001: 56) except on the home page itself, where the logo should not be a link, otherwise it will become a circular game (Nielsen quoted in De Klerk, 2001: 56).

For any website that has an identity closely connected to a specific country other than the United States, use that country's top-level domain. If the website resides in another country or if the website features a particular country's language/s. But if the website has customers outside the country and inside the United States, it is good to have another option of using the domain name .com. If available, register domain names for alternative spellings, abbreviation, or common misspellings of the website name (Nielsen & Tahir, 2002:26).

Domain names are effectively the real estate of the Internet, with easy to remember names being the virtual equivalent of prime website addresses (Whittaker, 2002:28). If the domain name is part of a registered trademark or you want to prevent competitors using similar names to attract business, register many variants (Whittaker, 2002:29). Begin the window title with the information carrying word - usually the company name, don't include the top-level

40

domain name, such as " .com" in the window title unless it is actually part of the company name, such as " Amazon.com" (Nielsen & Tahir, 2002:25).

4.3.6.2.   Navigation

Navigation means finding your way to what you are seeking and sometimes people get lost and disoriented (Johnson, 2003: 83); therefore they need good navigation to find their way. According to Johnson, in order to facilitate navigation (2003:84-102), minimize the number of navigation schemes, avoid deceptive duplicate links, avoid linking to other websites which are not the direct or original websites of the linked product. In addition the current page should be indicated in every page either in the navigation bar or by putting a page title prominently on the page (Johnson, 2003:107). Moreover, avoid the circle game where a page is linked to itself, avoid missing links by putting the navigation bar and the back button on every page (Johnson, 2003:112-117). Most importantly, navigation elements must be used consistently (Navigation, 2000 quoted in De Klerk, 2001: 45) and links should change colour when visited so that users can differentiate visited from non-visited ones (Johnson, 2003:240; Nielsen & Tahir, 2002:18). Furthermore, if a link does anything other than go to another webpage, such as linking to a PDF file or launching an audio or video player, email message, or another application, make sure the link explicitly indicates what will happen (Nielsen & Tahir, 2002:18).

Locate the primary navigation area in a highly noticeable place, preferably directly adjacent to the main body of the page. Group items in the navigation area so that similar items are next to each other. Don't provide multiple navigation areas for the same type of links , don't include an active link to the homepage on the homepage, use icons in navigation only if they help users to recognize a class of items immediately such as new items, sale items, or video contents (Nielsen & Tahir, 2002:19).

4.3.6.3.   Search

Putting a search box on every page will also be very helpful for both new or regular users of the website. Any website needs a good search feature since even the best navigation support will never be enough (Nielson quoted in De Klerk, 2001: 43). When displaying search results the number of hits should be specified and the presentation should repeat the query so that people don't have to remember exactly what they searched for as they evaluate the results (Brinck, Gergle & Wood, 2002:173).

4.3.6.4. Forms

Users often prefer Hints and Tips instead of Help. (De Klerk, 2001: 47). Furthermore, a link that includes both an icon and a label will satisfy both new users and those who are experienced with the interface (De Klerk, 2001: 51). For websites that request information from visitors, don't let people type in forms but let them choose most of the time, don't provide with default values unless they are the most likely, avoid compulsory clicking, use appropriate spacing between labels and boxes, use appropriate boxes/buttons, avoid putting controls that look editable while they are not, avoid controls that cannot be understood (Johnson, 2003:122-151).

4.3.7. Learnability

Keep search controls simple, use non-technical language, and give the user certain options, focus the search control on specific website content, don't use multiple search functions in one web page, and avoid duplicate hits. Non-relevant hits and missing relevant hits during search, can be avoided by using metadata and good indexing methods (Johnson, 2003:154-189).

The main benefit of a website map is to give users an overview of the website's areas in a single glance by dedicating an entire page to a visualization of the information architecture. According to Nielson (2002) a website map should be a map, not a navigational challenge on its own. Users go to website maps if they are lost, frustrated, or looking for specific details on a crowded website. Keep the website map simple, and emphasize a compact overview of the information space (Nielsen, 2002). If designed well, this overview can include several levels of hierarchy, and yet not be so big that users lose their ability to grasp the map as a whole. Website maps should be simple, compact layouts of links, and they should show everything in a single view (Nielsen, 2002).

The homepage design should be clearly different from all the other pages on the website either by using slightly different visual design or by using a prominent location designator in the navigational apparatus (Nielsen & Tahir, 2002:11). Keep ads for outside companies on the periphery of the page, and keep them as small and discreet as possible relative to your core homepage content. If you place ads outside the standard banner area at the top of the page, label them as advertising so that users don't confuse them with your website's content (Nielsen & Tahir, 2002:29).

4.3.8. Accessibility

Any website should be accessible facilitating access to users who need support because of visual, auditory, physical, and other disabilities; and enabling multilingual, multiplatform designs for diverse users (Shneiderman, 2001).

Although vital accessibility laws and policies are viewed as nonfunded mandates at a time when budgets are highly constrained and security and privacy are considered top priorities (Kreizman, 2003), they are a subset of overall usability, and a goal that should be incorporated into the design process.

Governments that are facing reduced budgets don't have to give up on efforts to improve e-government accessibility because constituents expect equal access (Kreizman, 2003). Accessible content should be an ongoing design goal, not a one-time project. Collaboration among developers, established policies or laws, and strong IT governance are keys to improving accessibility during tough fiscal times(Kreizman, 2003).

Including ALT texts for images is the oldest and easiest of the guidelines for making websites accessible to users with visual disabilities (Nielsen & Tahir, 2002: 49). They should also be designed to work in all browsers. Moreover the color contrast of the website should work in gray scale to accommodate colour blind users (Brinck, Gergle & Wood, 2002:309). The dominant standard for web accessibility in web design is currently established by the W3C. Several tools such as Bobby (www.cast.org/bobby) are availble for evaluating websites in terms of access for users with disabilities and provide detailed suggestions for improving a website (Brinck, Gergle & Wood, 2002:46).

Linguistic diversity on the global information networks and access for all to information in cyberspace are key issues in today's international debates and can be of crucial importance for economic development based on knowledge (Montvillof, 2003).

The home page is the organization's face to the world (Nielsen, 2002). On the Web you get only one chance to make an impression (Nielsen & Tahir, 2002: 2). If the first impression is not good, the website will not get a second chance because the user will never return. It is the most important page on most websites, and gets more page views than any other page. Although a website can be entered through different pages, not necessarily the home page, through search engines and other website links, people turn to the home page to get the

overview of the website (Nielsen, 2002). Thus, the home page is most likely to be the one that determines whether the visitors view one page, or many, at your website. If it gives clear indications about what is available at the website, and how to get to it, then the user's interest is likely to last longer (Richmond quoted in De Klerk, 2001: 40). Therefore although all the pages in the website are expected to comply with the eight criteria, it is of particular importance that the home page should do so.

4.4. Evaluation techniques

There are different evaluation techniques that can be used when assessing a website. These are (1) the usability test, which is the most common one and is usually done by analyzing users' feedbacks or questionnaires, (2) making a competitive analysis with other similar websites that can be used as benchmarks and (3) analyzing the server log records. E-mail and other forms of feedback from users such as form data, snail mail, and phone calls are also extremely informative usability data (Brinck, Gergle & Wood, 2002:400).

4.4.1. Usability test

Most of the time the success of a website is determined by its usability. Hence it is the most important test that needs to be performed on a website. But before performing the test, the number of tests needs to be specified, and a questionnaire should be designed, distributed and then analyzed. There are two types of usability tests, performing heuristic evaluation and the gathering of feedback from potential users.

4.4.1.1. Number of tests

According to Nielsen's (2000) study based on a mathematical model, the best results of a usability test come from testing no more than five users and running as many small tests as one can afford. When the number of users is increased from one to five, there will be better understanding of the system, whereas when the number increases further nothing new will be learned (Nielsen, 2000b). This process is done by a cost-benefit analysis of user testing. As the curve in Nielson's earlier studies indicates, fifteen users need to be tested to get a better result, but he suggests that it is better if the budget is used for taking five users three times in an iterative way. He suggested that even three users are enough to get an idea of the diversity in user behaviour and insight into what is unique and what can be generalized.

But when a website has highly distinct groups of users, more users need to be tested (Nielsen, 2000b). The multiple design alternatives must be evaluated for specific user communities and for specific benchmark sets of tasks. A clever design for one community of users may be inappropriate for another community or an efficient design for one class of tasks may be inefficient for another class (Shneiderman, 1987:11).

However, this idea of using very few users is functional when doing heuristic evaluation where people with specific professional knowledge about the different aspects of websites are used to participate in the evaluation. If the test is done by gathering feedbacks from the actual average users, the result could be more accurate if the number is more when analyzed statistically.

4.4.1.2. Analysing the usability test

The analysis can be done by using two different approaches with a similar purpose, the analysis of heuristic evaluation and the analysis of users' feedback.

Heuristic evaluation is the most popular of the usability inspection methods. It is a cost-and time-effective kind of evaluation since it is done with not more than 5 users and can be analyzed and finalized within a few weeks (Nielson, 2000; Kantner & Rosenbaum, 1997). Heuristic evaluation is done as a systematic inspection of a user interface design for usability (Nielsen, 2002). The goal of the heuristic evaluation is to find the usability problems in the design so that they can be attended to as part of an iterative design process. It involves having a small set of evaluators (with professional skills) examine the interface and judge its compliance with recognized usability principles, the "heuristics" (Nielsen, 2002).

The second one is the gathering of feedback from the average users of the website through questionnaires. Questionnaires are designed and can be distributed through the website itself, e-mails or on hard-copy. Results will be analysed statistically.

The evaluation in both cases is done based on the criteria described in part 3 above.

4.4.2. Competitive analysis with similar benchmarking websites

Competitive analysis techniques apply to your competitor's websites, to other websites with similar functionality (whether they compete with you or not), and to previous versions of your own website (Brinck, Gergle & Wood, 2002:83). As discussed in the previous chapter,

making a design critique is one of the basic processes when developing a website. The design critique is done by gathering information about similar websites including those of competitors and discussing every aspect of the designs from different approaches (Berkun, 2003). As this age is an intelligence age, where global competitiveness is crucial for survival (Cook, 2000:1), identifying the positive and negative elements that competitors are using is very important. A competitive analysis can be one of the fastest ways to hone in on a workable design paradigm for a product (Brinck, Gergle & Wood, 2002:83). We want to steal the good ideas of others and apply them to our design. This phase of design critique should not only be done at the beginning of website development, but be repeated from time to time throughout the life of the website, since the Internet has a dynamic behaviour. This is how an intelligent company works and remains globally competitive.

Furthermore, competitive bench-marking is a type of competitive analysis which is a process for measuring performance against those companies that are recognized for excellence in certain aspects of their business (Cook 2000:14). Here the design elements can be compared to the design elements of similar websites which are currently very successful. These websites acting as benchmarks can be of competitors or of non-competitors.

In analyzing for usability, we are looking for user interface ideas. This can be as simple as visiting competitors' websites and listing all the features they support as a first step to writing a functional specification for a website. Stealing ideas from competitors is a time-honoured technique for innovation, but it needs to be done with a cautious respect for intellectual property. Copyright law protects the way websites express their look and feel - the creative aspects of their design, such as their exact words or images and the way they have chosen to combine them. Do not assume that it is safe to copy just because there is no copyright notice: copyright and trademarks do not have to be explicitly declared to be protected. Although a competitive analysis is a fast and easy way to establish a starting point in design, competitors should not be given too much credit because it is not known if they have tested their websites or what hidden influences may have played a role in their design (Brinck, Gergle & Wood, 2002:84). Their website may look great, but they may be getting customer complaints.

New entrants to an industry bring new capacity, the desire to gain market share, and often substantial resources (Porter, 1979:139). According to Porter (1979:139) brand identification creates a barrier by forcing entrants to spend heavily to overcome customer loyalty, and product differentiation is one of the factors fostering brand identification. Achieving product

differentiation using the organization's resources and capabilities creates the competitive advantage of an organization (Competitive advantage, 2004).

More than anything, competitive analysis should be used for idea generation, but ideas developed will need to be corroborated with feedback from users (Brinck, Gergle & Wood, 2002:84). Therefore making a competitive analysis to determine how similar websites are designed and are working is another effective way of evaluating the performance and success of your website. It will also help you to see how the website can be different so as to attain competitive advantage.

4.4.3. Analysis of server logs

An abundance of information about visitors to the website can be recorded with the Web server software. Even the simplest website logs track how many people (unique visitors) saw the website over a given time, how many pages were requested for viewing and many other variables. By analyzing the server logs for any website one can develop quantitative data on the success of the website. The logs can even tell what pages were the most popular and what brands and versions of Web browser people used to view the website (Lynch & Horton, 2002). The logs can tell you about overall hits, conversion rates, entrance pages, search terms used to reach the website, effects of design changes, general growth over time, peak times, demographics, and system down-time (Brinck, Gergle & Wood, 2002:393). Server logs can also give information on the geographic location of the readers.

An in-depth analysis of your hit logs can reveal a substantial amount of information (Brinck, Gergle & Wood, 2002:393). The webmaster should archive all website logs for long-term analysis and should be prepared to add or change the information categories being logged as the needs and interests change (Lynch & Horton, 2002).

4.5.   Conclusion

Websites are mainly designed to be used by specific target groups. But most of the time the main users of the website are not involved during the development of any website. This can cause the website not to be user friendly, difficult to use, unattractive and not helpful to its target users. Besides a website might have drawbacks that can arise from poor back-end design. In order to identify the failures of a website, an evaluation needs to be performed from time to time. The evaluation should follow criteria based on website usability guidelines.

47

These criteria are the quality of content, attractiveness, user control, efficiency, helpfulness, learnability and accessibility.

The evaluation can be done using one or more of the three different tchniques. They are the usability tests, comparing the evaluated website with similar websites that can be benchmarks, and analysing the reports from server logs. Even though performing only one of the tests can assist in identifying the drawbacks of a website, the best and most recommended way is to use all three types of evaluation techniques and incorporate the analysis of the results from the three different tests. It is only by using all the evaluation techniques that a website's success can be measured.

4.6. Summary

This chapter points out how vital evaluation is to websites and how it can be performed effectively. A website needs regular follow-up and improvement after it is published, but for the improvement to be effective the website should be evaluated first. The assessment should focus mostly on testing the usability of the website, but should also test whether it is promoting the intended message properly, whether the design is still attractive and whether the website is highly competitive. Criteria through which the websites can be evaluated must be developed. The criteria developed to test the success of any website in this study are to assess the quality and organization of content, its attractiveness, whether it offers control to users, its efficiency, its helpfulness, and whether it is user-friendly as well as accessible. There are different evaluation techniques that can be used when assessing a website, based on the criteria developed. These are the usability test, which is the most common and is usually done by analyzing users' feedback or questionnaires, making competitive analysis with other similar websites that can be used as benchmarks, and the analysis of the server log records.

5. Chapter Five

Historical background of shabait.com

5.1. Introduction

Shabait.com is the official website of the Ministry of Information of Eritrea. It is a government website aimed at giving reliable information concerning the country and its development to the Eritrean people, especially those residing outside the country, as well as to anyone who is interested to know about Eritrea. The Internet in Eritrea is in its early stage; it started only at the end of 2000. Likewise the website is also very new; only one year has passed since it was published.

As the Internet in general and the publishing of the website specifically, are in their early stages in Eritrea, there are many difficulties and challenges regarding their development and management. The inconvenient ICT infrastructure of the country, the low bandwidth, lack of information policy, and the lack of skilled manpower are the main difficulties, and competition and high Internet costs are the main challenges facing the website shabait.com.

5.2. Overview of the Internet in Eritrea

Eritrea is a new country which was declared a sovereign state only in May 1993 after having gained independence in 1991. The history of using information technology as a means of information organization, retrieval and dissemination is also new and goes back only as far as 1991. Although the first four PC were imported to Eritrea in 1984/85, it was only after 1991 that an annual increase in the number of computers was seen (Andemariam, 1999:228), which was estimated to have reached 15,000 by the year 2000 (Habtemariam, 2002).

Even though Eritrea had one of the most sophisticated telecommunication networks in the 1950's, today it has one of the least developed telecommunication infrastructures on the continent (Andemariam, 1999:233). However, investment in telecommunication facilities in Eritrea is growing from year to year, replacing the old analogue switching systems with digital switching systems (Andemariam, 1999:240).

5.2.1. Existing ICT capacity in Eritrea

The Internet was introduced to the country on 15 November 2000 with a bandwidth of 512 KB downstream and 256KB upstream until March 2002, and was shared with other African

countries (Habtemariam, 2002). In March 2002, according to Habtemariam, the backbone service provider was changed to (WARSON), which gives 24/7 service as well as 1MB down stream and 512KB upstream of bandwidth. At the time of the interview the existing bandwidth in Eritrea was 2Mb download and 1Mb upload with the future plan to upgrade it into 6MB download and 2MB upload within the first quarter of 2004 (Habtemariam, 2004).

By the year 2002 there were an estimated number of 4000 Internet users and 20 cyber cafés in Eritrea, and this shows that there is a tremendous increase in users despite the poor connection speed. There were four ISPs: the TSE, CTS, EWAN Technology, and TFanus Enterprises. The number of cyber cafes in 2000 was only four, but by the beginning of 2004 it had increased to 43, which indicates that the growth rate is a multiple of 10 each year (Habtemariam, 2004).

The maximum number of wireless connection users per ISP was approximately 500, and as there were four ISPs, around 2000 individual users were found in the country. There are about 30 leased line users per ISP and about 20 users per line; hence it forms a total of 2400 individual users for leased line (Habtemariam, 2004). Therefore, the total number of Internet users in the country at the time of interview was estimated to be 5000. Although the bandwidth split up is done through key adjustment in the case of a leased line and by means of configuration in the case of wireless technology, the general split of the bandwidth into the four different ISPs is irregular.

5.2.2. Existing Policy instruments in the country

The objectives of the Eritrean Information Systems Agency is to develop an appropriate set of policies and management practices supporting a more effective and efficient application and exploitation of information technology within the government and the public enterprise sector (EMTC, 1994). There is another proclamation 102/1998 on communication and discussion which has been issued regarding ICT policy, but no policy regarding information or ICT has been formulated yet (Fessahazion, 2004).

There is a Directive though concerning communication with the motto "to connect the villages in Eritrea to the global village" (EMTC, 2000). The Objectives of the directive are:

- to ensure the Eritrean public has growing access to global information infrastructure

- to ensure that standard telecommunications, broadcasting and postal services are supplied as efficiently and economically as possible

- to ensure that this standard meets the social, industrial and commercial needs of the community

- to ensure that the objectives of the communications proclamation of the state of Eritrea are fulfilled in developing the Internet networks and services in the country by using the most appropriate technology and encouraging the widest practical participation of the Eritrean public and especially the disenfranchised segment of the society.

One of the functions of the communications department on the establishment of global information networks and services is to create and enforce a legal framework to protect intellectual property and copyright (EMTC,2000). The secondary domain name .gov.er is reserved for the government of Eritrea (EMTC,2000).

5.2.3. Future plans for ICT development in Eritrea

Currently demand for Internet is getting extremely high in Eritrea. Institutions such as NGOs, cyber cafés, colleges in Mendefera and Mai Nef'Hi are demanding new Internet connections. In addition there is high demand in Assab, a remote port city, which is 700km from the capital city Asmara, but is not connected to the Internet yet. To date the Internet reaches four administrative regions, although it is planned that it will reach all six administrative regions soon. Hence, future plans include the wide spread of the Internet in the country, so that it will be more useful in the educational field (distance education such as Cisco Networking and UNISA) as well as in medical fields (tele-medicine) (Fessahazion, 2004). Although the Cisco Networking and UNISA are already functional with the available capacity there is a plan to facilitate them in a much broader and more convenient way.

At this moment, as the Internet is still new in Eritrea, there are difficulties with limited experience, bandwidth, infrastructure and service providers (Habtemariam, 2004). As there is a scarcity/lack of experience, and especially as there is no clear policy in relation to the Internet or ICT, most work related to the Internet is done by trial and error. Besides there is high demand for bandwidth as compared to the very low supply.

5.3.   Overview of the organization

The press is divided into state-owned and privately owned (EMI, 1996). The Ministry of Information is one of the two divisions of press, owned by the State. It currently consists of three departments: the Radio, TV and Print Media. The services are presented in three major languages (English, Arabic and Tigrinya) but also in seven other local languages as well as two of a neighbouring country's languages. Basically it is aimed at providing the society with news, information, education and entertainment. Moreover, it is an important means of communication in raising public awareness of the ongoing development activities taking place in the country and thereby ensuring the participation of the society in the development activities.

The vision of the Ministry of Information is to build an adequate, free, accepted, certain, responsible and dynamic atmosphere for national public as well as private mass media (EMI, 2003).

5.3.1. Policy of the organization

In the government's proposal regarding news guidelines the policies of the Ministry of Information are:

1. to ensure the right of every citizen to attain full information of local, regional and world affairs.
2. to ensure appropriate coverage throughout the country's regions, urban and rural
3. to disseminate news programmes in all Eritrean and other relevant foreign languages
4. to construct and strengthen the public and private sectors of news agencies through research, training and equipment supply (support)
5. to draw up clear strategies and programmes for the development of professional skills and to decide on priorities.

5.3.2. Tasks of the organization

Tasks listed by the proposal for news guidelines are:

1. to establish and administer publicly administered radio and TV stations, newspapers, magazines, a news agency and Internet services

2. to introduce all government policies and institutions and their results or products to the public and to make the aiming of public opinion possible.

3. to provide concrete and complete information on happenings and development in Eritrea as well as on global issues.

4. to disseminate information that gives a positive image of Eritrea to the surrounding regions and the world.

5. to open a platform and to encourage citizens and organizations to give constitutionally protected opinions and to exercise their right to information.

6. to create a connecting bridge for the Eritrean people and thereby to strengthen national unity and harmony

7. to produce programmes that will help the young generation know about the Eritrean people's history and experience of the armed struggle as well as to make known their vast cultural heritage

8. to draft national policies with the cooperation of concerned institutions

9. by representing the state in national and international news conferences, to cooperate and exchange information with other countries

5.3.3. Structure of the organization

Radio Dimtsi Hafash, which has its roots back in the liberation struggle era, is a prominent arm of the media in Eritrea because of its long experience and coverage. It was launched in 1979 during the difficult times of the armed struggle with half an hour program per day, in Tigrinya and Arabic. At this moment, Dimtsi Hafash broadcasts in 12 languages for several hours a day in different meter bands. The high illiteracy level of the Eritrean population, which is roughly estimated to be more than 70% and the relative affordability of radio sets, puts the radio in an advantageous position compared to other mediums. Therefore its audience ranges from 70%-80% within the country and it is also audible in the neighbouring countries.

Soon after Independence, the Department of Information was organised at a ministry level and the newspapers of Eritrea started to be printed in three languages: Tigrinya (Haddas Ertra), Arabic (Eritrea Al-Hadissa) and English (Eritrea Profile). Though they were not reaching on time these papers have been the only means for connecting people residing outside the country with their home country. Circulation of the newspapers is limited to the literate population which is less than 30% of the total population.

Following the newspaper, Eri-TV, the Eritrean national television was established in 1993 in the two official languages only and later in 1998 English was included. A fourth local language has been included since 2001. Now Eri-TV along with Dimtsi Hafash and Radio Zara are reaching Western Europe, the Middle East and North and Central Africa through satellite-Arab Sat.

In addition to the three media, radio, TV and print, there is a news agency section, which is known as ERNA (Eritrean News Agency). It has correspondents in the six administrative regions of Eritrea and it is the main supplier of local, regional and foreign news for the three media.

5.4. Overview of the website shabait.com

For the past years due to the limited resources and capacity of the Eritrean mass media, information with respect to the country did not fully and immediately reach the vast international community and Eritreans in the Diaspora. In the last few years the Ministry of Information has been entirely dependent on other websites for dissemination of information, although the ministry itself is the main source of information in the country. Therefore, it was difficult for the ministry to communicate information on its own terms. This decade sees the emergence of the digital firm, where firms are managing nearly all significant business processes and relationships with customers, suppliers and employees as well as key corporate assets digitally (Laudon and Laudon 2002:6). Due to this, alongside its service presentation through radio, TV and the printed press the Ministry of Information has taken the initiative to present its services in the digital way by publishing a website. This shows that the organization has made some changes in its business model. According to Laudon & Laudon (2002:106) a business model is an abstraction of what and how an enterprise delivers a product or services, showing how the enterprise creates wealth. The official website of the Ministry is named shabait.com and was launched on 24 May 2003 at the celebration of the 12th year of Independence of Eritrea.

5.4.1. Mission and vision of the website

The mission of the website is to serve as a sole provider of Eritrea-related credible information to the entire Eritrean population at home and abroad and to the vast international community. It is also to enhance the outreach of information the other mediums are incapable of doing, thereby introducing the emergent country in order to facilitate various activities -

investment, tourism – beneficial to the country's development. Besides, it is to serve as a crucial and up-to-date reference with regard to Eritrea's progress in political, social and economic transformation. Therefore the main objective of the website is to transfer fast and reliable information for Eritreans in the Diaspora as well as foreigners by becoming the official medium of information of the state of Eritrea.

The vision statement of the website is that it is dedicated to supply credible and high-quality information relevant to Eritrea so that its visitors will come to view it as a trustworthy Eritrean source, on which they will depend for first-hand information.

5.4.2. Domain name of the website

Although some changes and modifications have been made since the day of the launch of the website, it has not yet proved that it is presenting the best service to the target audience. The name Shabait was chosen by a senior official of the Ministry, when all the other possible names such as MOI (Ministry of Information) and Zena (which means news in Tigrinya - one of the Eritrean local languages) were found to be already registered as domain names (Abdurrahman, 2004). Shabait is a place in the northern Red Sea administrative region of Eritrea where the Radio Dimtsi Hafash (voice of the masses) was stationed for 9 years in the 1980s during the armed struggle for independence. Hence the name has a good connection with the history of the Ministry.

5.4.3. Existing capacity of the website

At present the bandwidth of the Ministry, 64KB, is shared with other organizations, but there is a plan that a 64KB dedicated line will be assigned to the Ministry very soon. Software in use are Apache server, Real server (audio and video), WSFTP pro, Finacat pro (for video in Mac), and Goldwave audio (Abdurrahman, 2004). The interface design being used is a mask interface prepared by an Eritrean webmaster of the website www.dehai.com – residing in the United States, and contents are just pasted on it by the webmaster in Eritrea. The webmaster in America is the only one with full access to the root directory, while the webmaster residing in Asmara has access only to paste the contents on the mask interface.

5.4.4. Information presentation on the website

At first the website was published in three languages: Tigrinya, English, and Arabic, but due to translation problems (language quality) it is now using only English. News in Tigrinya and

Arabic was discontinued when many of the audience complained about the poor language quality, but the newspaper in Tigrinya and Arabic is entered as a PDF file. This problem is due to the shortage of manpower with good language skills at the Shabait unit. Pages which hold the news, news papers as well as audio are updated daily, while video is updated twice a week, and the contributions page is updated conditionally (Abdurrahman, 2004).

5.4.5. Financial benefits from the website

An ad banner has not been used for generating money till now, since the standard payment that is set by the Ministry is very high and not affordable by organizations or individuals from within the country. Senior officials of the Ministry thought that as it is a government website it should have a high standard of advertising. There are some requests from abroad for advertisements, but due to the non-existence of an online payment system this is not yet functional. The few advertisements that have been placed there are for free. Hence no financial return from the website has been obtained till now.

5.4.6. Future plans of the website

Future plans of the website are to improve connection speed, include live audio and video (when the connection is better) and to improve the interface design of the website. Meanwhile the difficulties of the website are connection speed and language fluency.

5.5. Overview of Shaebia.com (the competitor)

Shaebia.com is the only competitor of Shabait.com from inside the country. It is owned by the PFDJ (People's Front for Democracy and Justice) political party and was published a year before Shabait. It is being run by the same remote webmaster as that of Shabait, and they share similar problems and even have the same page grids. The website has the same purpose as the Shabait with a website policy to serve the masses by giving equal chance of participation to all religions, tribes and languages in the country (Tesfamariam, 2004). Although the meanings of the names of the two websites are totally different, they sound similar, which is confusing. Thus, these two websites have similar names as well as purposes. Shaebia.com was published in 2002 with the purpose of providing information about Eritrea to the diasporas, when the Ministry of Information was not ready to create a website. It is still continuing to do so although the first-hand information belongs more to the Ministry of Information. Hence at this moment they are two competitive websites. However, they share resources such as software like adobe and anti-virus software.

In Shaebia, Arabic and Tigrinya articles were entered in PDF format for the convenience of the readers with languages - supporting software problems, but since PDF files are images they need more loading time than the normal text. Hence they reduced publishing in those languages in order to maximize the efficiency of the website. Therefore the website is more English focused. Otherwise they have no language proficiency problems unlike Shabait.com. Target groups of the website are Eritreans abroad and foreigners, but especially Eritreans in the United States. An Arabic column was entered with each article, having a summary in English in order to be searched by search engines. However there was no response from the audience even when Arabic was stopped, indicating that there are only few or no Arabic readers interested in the website.

The main problems of the website are no training of staff, maintenance after a severe virus attack, connection speed for uploading data and timing with the webmaster in the USA. When the connection is so bad that uploading is absolutely impossible, contents to be updated are sent through e-mail to the webmaster residing in the United States (Tesfamariam, 2004).

The ad banner of Shaebia is being in use by the thumbnails representing the Housing Bank and the Ministry of Tourism, whereby they are linked to their websites at Shaebia's server. The agreement is that they pay for the space usage of the server while they can upgrade their website by themselves. There are plans to allow big investors and book publishers to advertise soon.

5.6. Difficulties in the development of shabait.com

Since the Internet is in its early stage there are some difficulties identified by the website development team. These difficulties are classified as the inadequate infrastructure and bandwidth, lack of skilled manpower, too few resources, and the absence of a policy.

- Infrastructure and Bandwidth: - The poor development in telecommunication infrastructure in the country strongly affects the progress of the website. Besides, the availability of only 2MB for the whole country and only 64 KB for the organization of the website makes it hard for the webmaster to upload contents.
- Skilled manpower: - Since most of the staff are new journalists, the website lacks skilled manpower in the field of online publishing. Besides, there is a lack of staff with different language skills.
- Resources: - software such as the antivirus and adobe are not easily available.

- Policy: - There is no policy concerning information or ICT and hence no policy concerning the website.

5.7.   Challenges experienced in the development and management of shabait.com

- Competition: - This is the biggest challenge when developing the website. The shaebia.com is a highly competitive website, and as it was published earlier, people might know it better than the later one. Besides, as the sources of both are from inside, people may have difficulties in choosing the most reliable website. Most of the domain names are very similar, which can confuse people. Moreover, as confirmed by the Shaebia webmaster, no complaints have yet been received concerning language fluency while that is one of shabait's biggest problems. Therefore, even without looking for other competitors the existence of Shaebia.com in the WWW is a big challenge to the website Shabait.com.

- Cost: - The cost of server, maintenance, and bandwidth is very high when publishing websites. This is a challenge by itself and can be overcome by using the ad banner as money generating area.

- Speed: - Connection speed is also challenging, but it can be overcome by either broadening the bandwidth or lessening the file sizes to be uploaded.

5.8.   Conclusion

Although it is still new, the website shabait.com could improve and show changes within its first 12 months. Having a big competitor from inside and many other competitors from outside the country is very challenging and urges the senior officials as well as staff of the website to work very hard to gain the highest position as the foremost reliable source of information about Eritrea. In order to ensure this prestige, the shabait.com staff needs to be trained and additional skilled staff should be recruited to the section. Acquiring a bigger bandwidth will definitely help the webmaster to perform his work more easily. The fact that the webmaster residing in Asmara does not have full access to the root server to update not only the contents but also the interface design, is a big constraint for the website. It is difficult to update the website regularly in all aspects using user feedback to satisfy their needs. The fact that there is no functional policy concerning information and ICT in the country will make the website vulnerable to some rights infringements.

5.9. Summary

This chapter deals with the background of the website. Eritrea is a new country with only 13 years of sovereignty and has a history of computers which starts only 13 years back. Similarly, the Internet was introduced to the country only at the end of 2000 and presently reaches only four of the country's six regions. Despite constraints, such as the lack of a good ICT infrastructure, experienced manpower, ICT policy and low bandwidth, there is a high demand for the Internet in the country. Thus future plans are to improve the facilities for the Internet, to connect properly all parts of the country to the Internet and to reap benefit from technological advancement especially in the fields of education and medicine. Due to the introduction of the Internet, organizations have started to make use of websites as one of their strategies to success. The Ministry of Information is one of these organizations, which are using the advantages of the Internet to provide their services in a new form to their target audiences. Till May 2003, the Ministry of Information offered its service to the public through three media: the radio, TV, as well as newspapers with three basic languages, Tigrinya, English and Arabic and additional local as well as international languages. Now, Shabait.com is its official website aiming at giving reliable information concerning the country and its development to the Eritrean people, especially those residing outside the country, as well as to anyone who is interested to find out about Eritrea. Meanwhile the low connection speed and lack of skilled manpower for content preparation are seen as the main drawbacks of the organization's website. Moreover, the existence of a twin website, Shaebia.com, with the same purpose is the biggest challenge for the website. Therefore, the website, as it is in its initial stage, needs thorough assessment to identify its successes and failures.

6. Chapter Six

Evaluation of shabait.com

6.1. Introduction

As discussed in chapter four, developing a website is not a one way process where a website is created and is then totally neglected once published. It should be enhanced from time to time in order to ensure its usability, attractiveness, competitiveness, and most of all, its way of promoting the message of the organization. For this to turn out well, it needs to be evaluated first. Then, based on the result of the evaluation, the improvement of the website can be planned properly. Hence every website needs to be assessed from time to time and to be redesigned to meet the organization's and customers' needs.

Shabait.com is evaluated based on the criteria described in chapter four. The evaluation consists of both qualitative and quantitative methods and is approached in two different ways. The first approach is getting users' feedback by analyzing the usability test, whereas the second one is comparing it to similar websites, which can be considered as benchmarks.

6.2. Evaluation criteria

The researched website is evaluated based on the evaluation criteria developed in chapter four. These criteria are the quality of content, content organization, attractiveness, user control, efficiency, helpfulness, learnability and accessibility. Although for the entire evaluation the website is approached in two different ways; through the usability test and the competitive analysis, all eight criteria are used in both cases to test the fitness of the website. Moreover, these criteria are used in both the quantitative as well as qualitative methods of evaluation. Therefore, the researched website will be discussed in terms of all the eight aspects of the assessment criteria in order to make a complete evaluation.

6.3. Evaluation techniques

As discussed in chapter four there are three methods of evaluating a website. These are the usability test, competitive analysis as well as the server logs analysis. But, since the information from the server track logs was not available for the researcher at the time of the evaluation, it could not be applied. Hence only the two methods: the usability test and the comparative analysis were used to evaluate the researched website.

6.3.1. Usability test

This method of evaluation is carried out through a survey of user's feedback with two consecutive steps, data gathering and analysis of results in which results are analysed in quantitative as well as qualitative ways.

6.3.1.1. Techniques used for Data gathering

A questionnaire of 48 questions was designed to test the usability of the website (Appendix 1). The questions were derived from the literature review covering most of the evaluation criteria pertinent to the researched website described in the previous chapter. The questionnaire passed through three iterative versions with modifications based on results from individual tests selected from the potential sample and the feedback from a statistician. At the end the final version was used for collecting the actual data.

The questionnaire was structured in such a way that questions regarding similar attributes are grouped together into sections to form seven sections and one subordinate section. To start with, respondents were asked to fill in their location, frequency of using the website, their age, gender, language preference and the way they found out about the website. Then the sections containing the questions directly related to the usability of the website follows. These sections are the attractiveness, efficiency, helpfulness, quality of contents, user control, searchability, accessibility and, lastly, the browser and platform type, which is the continuation from the accessibility section.

As the target users of the website are scattered in the diaspora, data gathering was not easy. The process used for the distribution of the questionnaire was through e-mails. The questionnaire was sent to some contacts electronically and they were requested to forward it to as many people they knew as possible. Hence, a snowball technique was used to distribute the questionnaire to as many people as possible. However, two weeks after the dispatch of the questionnaire, only fourteen responses had arrived. Hence, these fourteen responses were used for the survey.

The main reason for the small number of responses was that the questionnaire did not reach the actual users of the website. This was due to a lack of communication with the webmaster. Instead of dispatching the questionnaire through e-mails to possible users, posting the questionnaire on the website would have been the best way to get more feedback from the

actual use
through e-
being of tl

:other alternative would have been sending the questionnaire
:ers of the website, who showed their concern about the well-
feedback to the webmaster.

6.3.1.2.

Despite tl ✓ the questionnaires were incompletely filled in, all fourteen
responses :e result helped the researcher to draw some conclusions about
the usabil:

The natur : questionnaire was to allow people to give their responses in
two ways :pecific number on a 1 to 6 scale depending on how they rate a
specific q :ond one was to write their comments in their own words in the
comment :th the quantitative and qualitative responses were analysed to
come up :sion on how usable the website is.

6.3.1.2.1. *is*

The quan: :e analysed using statistical software known as Statistica 6.1. At
first the r :ions was checked through the cronbach alpha. Cronbach alpha
is the coe with the value between 0 and 1 and a value of 0.7 or higher is
acceptabl :ce researches (Nunnally, 1978: 245). A high value of reliability
or a valu :questions are well-grouped into sections where all questions in
one sectic :heme.

As can b , most of the individual questions drew an average response. In
the effici :stions 14, 15 and 16, which ask about the download speed of
graphics, :, as well as video files, scored less than three. This shows that
most of t :ot satisfied with the download speed of the website especially
when the :her multimedia objects on the website.

In the q :ion, questions number 26, 27 and 28, which ask about the
accuracy :nts and check if contents are based on advertisements and
propagar :onse of less than 2.5.

All the questions within the user control section drew an average response closer to 3. Hence we can conclude that the website is doing poorly regarding the easy readability of PDF files, clearness of notices and advertisements, audio listening as well as accessing earlier contents.

The reliabilities of the sections are summarized in the following table.

Table 6:1 Reliability of questions

Section title	Cronbach alpha
Attractiveness	0.94
Efficiency	0.71
Helpfulness	0.92
Quality of content	0.91
User control	0.67
Searchability	0.82

The first section of the questionnaire, which tested the attractiveness of the website, contained 11 questions, and the answers to the questions were very consistent with the reliability value of 0.94. This means the questions are fully related to the section title. Secondly, we find the efficiency section of the questionnaire with 4 questions. The answers proved the questions to be reliable with the value of 0.71. The third section of the questionnaire tested how helpful the website was. It consisted of 7 questions, with the reliability of 0.92. Section four was a group of 14 questions that tested the quality of contents, with the reliability of 0.91, hence the questions were dependable. The fifth section of the questionnaire, which deals with the user control, consisted of 4 questions with the reliability coefficient equal to 0.67, which means not all the questions are related to the section title. In fact it was clearly identified by the software that the last question is an unrelated one, which lowered the reliability coefficient. But since the value can be rounded to 0.7 it will not be a threat to the reliability. Section six of the questionnaire is searchability made up of 5 questions with the reliability coefficient equal to the value of 0.82. Hence from these values it can be concluded that all the questions were found to be correlated to each other and therefore reliable.

Therefore, since the questions are found to be highly reliable, an analysis taking the questions in groups as sections was possible. A summary of the results from the usability test is presented in table 6:2 as well as in figure 6:1.

Table 6:2 Evaluation of the different dimensions of the usability test

	Descriptive statistics				
Variables	Mean	Median	Minimum	Maximum	Sta.Dev
Attractiveness	4.07	4.30	1.18	5.64	1.08
Efficiency	3.19	3.30	1.80	5.50	1.09
Helpfulness	4.25	4.36	2.00	5.71	1.16
Quality of content	3.32	3.33	1.79	4.89	0.99
User control	2.96	3.00	1.25	5.25	1.11
Searchability	3.94	3.80	2.20	5.60	0.98

The figure is represented in the form of box plots where 50% of the responses fell in the boxes, while the other 50% fell on the non-outlier range. The median of each section is represented by a small box inside the 50% boxes, while extreme response outside the range is represented by a small circle.
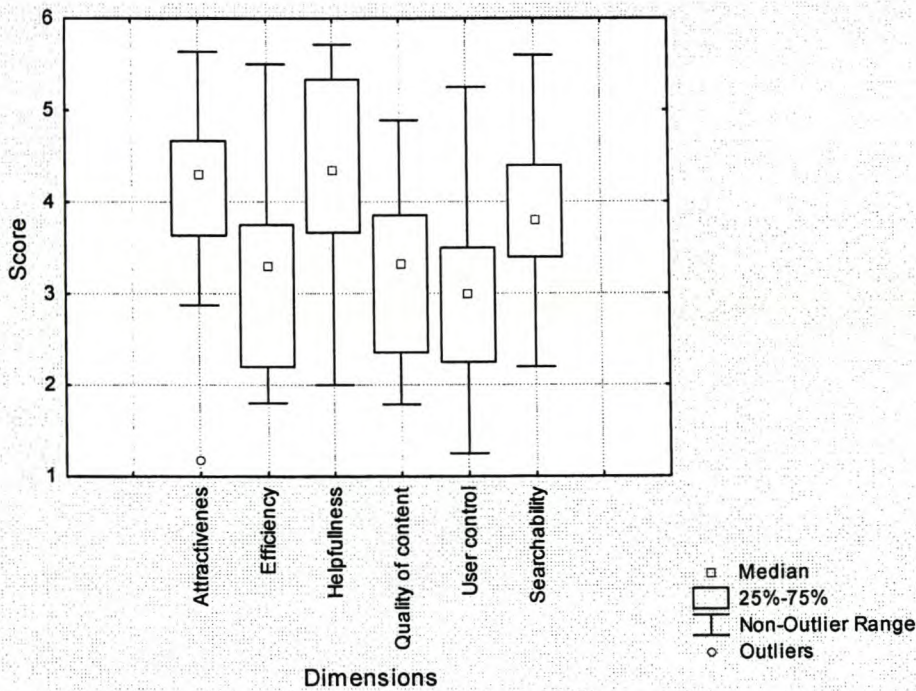
Figure 6:1 Box plots of the different dimensions of the usability test.

The first section was tested from being very bad = 1 to being excellent = 6. The range of the responses is between 2.9 and 5.6 with the 50% of the responses falling between 3.7 and 4.6, and one response at the value of 1.1, which is completely out of the big range. The average

response is the value approximately equal to 4, which means good. Hence the attractiveness of the website is evaluated to be reasonably good by most of the respondents.

The second section was assessed from very slow = 1 to very fast = 6. The range of the responses is between 1.8 and 5.5 with the 50% of the responses falling between 2.2 and 3.7. The average response is the value approximately equal to 3. Hence the website is rated to be on average regarding download time, although from the 50% between 2.2 and 3.7, one can conclude that the website is slow to download.

The nature of the responses for the third section was from fully disagree = 1 to fully agree = 6 bases. The range of the responses is between 2 and 5.8 with 50% of the responses falling between 3.6 and 5.4. The average response is a value approximately equal to 4. Although the 50% respondents fall closer to the fully agree scale, it can be concluded that the website is evaluated to be helpful enough.

Responses for section four were from fully disagree = 1 to fully agree = 6. The range of the responses is between 1.8 and 4.9 with 50% of the responses falling between 2.4 and 3.9. The average response is a value approximately equal to 3. Hence the content of the website is assessed to be of low quality.

The fifth section was responded to from fully disagree = 1 to fully agree = 6 bases. The range of the responses is between 1.3 and 5.3 with the 50% of the responses falling between 2.3 and 3.5. The average response is the value 3. Therefore, it can be said that users have little control over the website.

The nature of the responses to section six was from fully disagree = 1 to fully agree = 6 bases. The range of the responses is between 2 and 6 with the 50% of the responses falling between 2.3 and 5.6. The average response is the value 4. Hence the website's search facility is ranked to be moderate, although the range of the responses falls in two extremes.

The seventh and eighth sections of the questionnaire consisted of two questions each and are interdependent of each other. The seventh section checks the accessibility and the eighth follows to check which platform and browser were used when surfing the website. The aim of the sections is to find how accessible the website is, using different platforms and browsers. The result showed that 92% of the respondents used Windows and 8% used Linux. This shows that most of the respondents used Windows while very few used Linux. Moreover,

86% used Internet explorer, 21% used Netscape navigator, while 14% used other browsers such as Mozilla and America Online. All of the respondents found the website to be accessible using different platforms as well as browsers. Hence the website is proved to be accessible in Windows and Linux platforms and it can be accessed using any browser so far.

Finally the website is ranked to be on average when tested for its attractiveness, although at a slower downloading rate. It can be said that users have little control over the website, even if it is evaluated to be helpful enough. The content of the website is assessed to be of low quality. The website's search facility is ranked to be moderate, although the range of the responses falls in two extremes. When it comes to accessibility, the website is proved to be accessible in Windows and Linux platforms and in all browsers. In general, the website is assessed to be on average in its usability by the respondents.

6.3.1.2.2. Qualitative analysis

The following points are the qualitative responses summarized from the comments at the end of each section. After all, according to Nielsen (2004), qualitative analysis presents reliable results.

- *Attractiveness*: - The Logo is not designed in such a way that it wins credibility by promoting the message or identity of the organization. Moreover, the website is too colourful, the link colour is not consistent, and the colour used for the contributors /authors is reflective.

- *Efficiency*: - The website is slow in general and especially the PDF formatted newspaper is very slow to download. Besides it is too colourful and has many pictures that can slow it which can be simplified, or alternately a text only version can be used as a solution. There are also problems with audio files and scanned files and graphics. Downloading the website is very slow perhaps due to the background colour and several pictures.

- *Helpfulness*: - It would have been better to have archives icons to search for earlier contents.

- *Quality of content*: - Contents are exactly the same as the contents of the other competitive website, shaebia.com. Therefore, people prefer to use the older website, which they are familiar with, to get the same information. Moreover, contents are not very detailed. In fact too much information is packed into a very short article, which

lacks flow and makes it difficult for users to grasp the message properly. Besides the low level of language skills (English) is constantly noticed. The language used focuses on local, not international, users with many typical local words used that may not be understood by international users.

- *User control*: - It is difficult to find where archives are; there should be ways in which old information can easily be accessible. Such information available on the web should not be limited to 'news' or 'propaganda', but should also be available for educational and research purposes.

- *Searchability*: - The search facility does not cater for groups of users. It needs to be designed in such a way that it accommodates the needs of various users. The lack of logical flow in the navigation also has to do with the way the website is designed.

Therefore, the website lacks both aesthetic as well as content quality. In addition, previous contents are not easily accessible and download is usually slow.

6.3.2. Comparative analysis

Taking some good ideas from previously designed websites helps to avoide the re-invention of the wheel and focus on innovating new ideas or rather spending time on improving the existing ideas. A study of similar websites is done in order to apply the good qualities of their designs to the researched website. This technique is helpful to save time spent in thinking about re-doing the website from scratch and is done in three steps. First the benchmarking websites are selected, then they are studied thoroughly and criteria of comparison are formulated based on the literature studies in chapter four. At the end the actual comparison is made.

6.3.2.1. Selection of benchmarking websites

The researched website will be compared with two international websites with similar objectives. These websites are bbc.co.uk and china.org.cn. Both websites aim at giving their audience news and information about the world, although the latter concentrates mainly on China. The BBC website is one of the most successful media websites worldwide, whereas the Chinese website is a government owned media website; the aim of both websites is similar to that of shabait. These websites are chosen to benchmark the researched website, because it is believed that they possess many good qualities regarding the design of media websites. These good qualities are identified based on the literature study.

The BBC present a well recognised content produced to a very high standard, their websites work to leverage that content in a new context, providing bulletin boards, additional background context for stories or programmes, and repurposing material in a fashion that is easier to use on screen (shorter stories for example) (Whittaker, 2002:22).

6.3.2.2.   Competitive analysis

The selected two websites are studied comprehensively according to the criteria developed in chapter four and are compared to the researched website. The criteria are the quality of content, content organization, attractiveness, user control, efficiency, helpfulness, learnability as well as accessibility. The two benchmarking websites are found to have interesting features, from which Shabait can learn, especially features such as the language diversity, content organization, interface design and domain name choice.

6.3.2.2.1. *Quality of content*

The quality of content in both the Chinese and BBC websites was not thoroughly studied during the research; however, it seems to be well presented with good language quality, accuracy, authority, coverage, and objectivity.

6.3.2.2.2. *Content organization*

BBC's home page is organized in such sections as news, TV programs, radio, weather, other BBC directory sections and a search section, where each section leads to specific home pages and where details of contents are organized in each section. The Chinese home page on the other hand, is organized into weather, China (local news), international (news), business, culture, government, sci-tech, environment, life, people, travel, weekly review, which are all arranged at the left side of the website as navigation buttons and can be accessed by clicking into them. Unlike the bbc.co.uk each section of the China.org.cn does not have a different interface design. However, in both websites content is organized in such a way that related information is grouped together and can be found easily.

In comparison, contents in Shabait.com are not organized in such a way that information is grouped properly. Although the navigation of Shabait is consistent throughout the website some labels of the navigation are inappropriate. These labels are the sports and arts, Dimtsi Hafash, Shabait guests and Haddas Eritrea. The sports and arts page does not contain any content related to either sport or art, besides sports and arts are two independent issues that

should be put on two separate pages. The Dimtsi Hafash page consists of audio files in Tigrinya and Amharic (the Ethiopian national language) from radio broadcasts, but the label represents only the Tigrinya broadcast. The Shabait Guests section contains video files related to the history or celebration activities in the country, which have no association with the label. The Haddas Eritrea page is a page that contains both the Tigrinya as well as the Arabic (Eritrea Al-Hadissa) newspapers, but the label is restricted only to the Tigrinya newspaper.

Moreover, there are pages with only one or no content. These are the Development page with no content at all and the History and Culture page containing a single item. Unlike the rest of the pages in the website, which need daily or at least weekly updating, these pages should have been the most static pages. Unfortunately contents were prepared for them, although they should have been completed during the early phase of the website development – the information architecture stage.

Therefore, organizing the website by grouping similar contents together and giving them proper labels as in the BBC and the Chinese websites, will be more appropriate.

6.3.2.2.3. *Attractiveness*

The Logo of the bbc.co.uk website is made up of a thin grey strip with the grey BBC letters on white squares in the left corner. The logo is kept the same throughout the website. Similarly, the Chinese website has a simple logo in Chinese letters (which is translated to English as China Internet) and is consistent on all the pages throughout the website. Hence both the websites have self-explanatory, very simple but beautiful logos. The background of all the pages other than the home page of the bbc.co.uk is white with the dark red, dark blue and black font colours providing good contrast throughout the website. Likewise in the Chinese, the background is white throughout the website, while texts are in black and dark blue colour, which provides a good contrast.

The researched website however, has a disturbed logo with too many graphics and strong colours. Although what is at the top of the screen describes Eritrea, its government, flag and history, it looks as if too many images are cramped in such a small area with a lack of harmony. Besides the choice of background and text colours are difficult to read although they contrast well. People are used to reading black writing on a white background, and it is

not convenient for the eye, if it is reversed. In addition, in shabait.com some information such as notices and advertisement in the PDF formatted newspaper are hardly visible.

Both the home pages of the Chinese and BBC websites are always less than two screen sizes long. Users can get all the information on the home page without scrolling much, which helps them focus more on the contents. However, Shabait's home page is more than four screen sizes long and users have to scroll down to view what is at the bottom. The width of the screen of shabait.com is flexible (100% of the window width) and it always fits the screen of any resolution, whereas bbc.co.uk as well as china.org.cn are designed with fixed screen sizes so that there will always be a white space on the right side of the screen when viewed on monitors with a high resolution. Hence, although Shabait page width is designed appropriate for users with all kinds of monitors, its home page length needs to be shortened, which implies change in the content organization.

6.3.2.2.4. *User control*

Although all three websites, the Shabait, Chinese as well as BBC have an option where readers can send articles through e-mail, this facility of Shabait is not properly functional. However, they all have an efficient print version.

6.3.2.2.5. *Efficiency*

Download time of home pages of the three websites was checked at the same time on the same computer and the result came up to be BBC in 3 seconds, China in 14 seconds and Shabait 11 seconds. The Chinese website was less speedy, perhaps due to the animated advertisement at the top of the screen. Download times of inside pages of the websites are BBC in 7 seconds, China 8 seconds and Shabait in 2 seconds. The audio and video files of shabait are fast to download; on the other hand the PDF files are very slow. Hence, although Shabait is doing fine in downloading speed, improving its speed to a much faster speed, especially regarding of the home page, will make users more satisfied.

6.3.2.2.6. *Helpfulness*

Domain names are very important and should be self explanatory, since they are used as trade marks of organizations. The domain names of both the BBC and the Chinese websites are very expressive. Anyone can easily understand they are BBC and Chinese websites at the first glimpse of the URL. Moreover, users will easily recognize from their primary domain names

.uk and .cn that they are based in the United Kingdom and China respectively. However, the domain name shabait.com is not self-explanatory. Although the name Shabait has a history associating it with the Eritrean Ministry of Information, it is still unfamiliar to most people and especially to people who have not made an in-depth study of the history of the country. Besides, the primary domain name com indicates a commercial website, whereas neither government nor Eritrea are indicated there. Neither the name Shabait nor the primary domain name .com is self- explanatory, nor do they indicate that the website is an official website of the government of Eritrea.

In contrast to the Chinese website, navigation in Shabait doesn't have a logical flow. This can prevent people from easily navigating through the website. Besides, the colour of a link does not change when visited in all three websites, so users might revisit links they have already seen without knowing that they have already visited them.

6.3.2.2.7. *Learnability*

In Shabait the search box is consistent throughout the entire website, having the same look and is to be found on every page. This is different from both the BBC and the Chinese websites where multiple search boxes are observed on their home pages. However, during search, unlike on the BBC and Chinese websites, search items and the number of hits are not shown on the result page in Shabait. Readers are required to have high recalling ability to remember the search items throughout the search.

The Chinese website has an easily understandable website map, whereas both the BBC and the Shabait are totally without this facility.

6.3.2.2.8. *Accessibility*

Both the BBC as well as the Chinese websites have language options through which users can read the website. Although the main page starts in English in both cases, having these options helps users to choose the language they prefer and they can access even the menus and other information in their language of preference. BBC has the language option at its news section only, so that readers can select the news page in 43 different international languages, whereas the Chinese website has 9 alternative international languages for the entire content. Hence the two websites are able to present their information multilingually assisting users to have access to information in the language of their preference.

As mentioned in Chapter 5, the state-owned media organization of Eritrea gives information to the public in various local as well as international languages. Basically, three of these languages, Tigrinya, Arabic and English, are given priority in all the other media. However the website is currently working in only one language, English, although the PDF formatted newspapers are entered in Tigrinya and Arabic. The website doesn't provide users with an option to view the website in languages other than English. Therefore, like the BBC and Chinese websites, making the researched website available in diverse languages (for the time being English, Tigrinya and Arabic) will be more helpful for the diverse population of Eritrea in order to access first-hand information in the language of preference.

Unlike on the BBC website, there is no alternative text to graphics in the Chinese and the Shabait websites and users with image disabled browsers cannot understand what they have missed. Also users with visual disabilities, who use text reader software to browse the website, will have the same problem. Moreover, contents in audio are not transcribed nor do alternative text versions exist, and therefore they are not accessible by people with auditory disabilities. Added to this, the colour combination is created in such a way that there is no clear distinction between the colour of links and the background colour. Also red texts on blue background can create confusion for users with colour blindness.

6.4. Conclusion

Shabait.com is a website the aim of which is to give news and information about Eritrea to all concerned people in the Diaspora.

Users using both the qualitative and the quantitative methods of response indicated that the website has a low content quality. Moreover it was found to be of poor content quality when compared to the benchmarking websites. Although its organization was rated to be average by the users, it was found to be not well organised, not well grouped and with inappropriate labels when compared with the BBC and Chinese websites, which makes it inconvenient during information retrieval.

The qualitative answers indicated that the website was attractive, but it was evaluated to be not attractive by some users who gave qualitative responses, as well as when compared to the two benchmarking websites. Although users rated the website to be slow it is of average speed when compared to the benchmarking websites. However, it is slow to download the PDF formatted contents.

The website doesn't give good user control when previous contents need to be accessed and when sending articles through e-mail, but it gives good control during printing. On the other hand, the website was evaluated to be helpful by users, but its unfamiliar domain name, flowless navigation, as well as the link colour not changing when visited makes it not very helpful. Users found the website to be easy to learn. But although there is a consistent search box on every page, the fact that the number of hits and search items are not specified in the result page makes search difficult.

Although it is ascertained by the usability test that the website is accessible in all platforms and browsers, it lacks multilingual support and does not provide access to users with disabilities or with limited multimedia features.

Therefore, the usability test and comparative analysis of the website indicates that the website is not presenting its information to the users in an appropriate way and needs enhancement. Besides it is not advertised well, so there definitely are potential users out there who have no idea that it exists.

6.5.   Summary

This chapter describes the comprehensive assessment and analysis of the researched website. The website Shabait is evaluated based on the criteria developed in chapter four, both qualitatively as well as quantitatively, except the server track logs. A questionnaire of 48 questions with high reliability was developed based on the evaluation criteria, and distributed electronically to as many users as possible. The questionnaire allowed repondents to respond in two ways: by marking a number between 1 to 6 and by writing in the comment boxes. A sample of 14 was used for the analysis, and quantitative results were analysed statistically with the aid of the Statistica software package where a full summary representation is presented in a box plot form, while the suggestions are analysed qualitatively.

The website is ranked to be average when tested for its attractiveness, although it downloads at a slower rate. Users have little control over the website even if the website is evaluated to be helpful enough. The content of the website is assessed to be of low quality. The website's search facility is ranked to be moderate, although the range of the responses falls between two extremes. When it comes to accessibility, the website is proved to be accessible in Windows and Linux platforms and in all browsers. In general, the website is assessed as being usable by the respondents. However the qualitative summary of the comments shows that the website

takes long to download and it lacks aesthetic and content quality as well as accessibility to previous contents.

The second method of evaluation was done by comparing the website to two international websites of similar purpose. The benchmarking websites bbc.co.uk and china.org.cn were selected based on the literature study, because of their interesting features such as language diversity, content organization, interface design, and choice of domain name. These features can be adopted by the researched website. At the end a conclusion is drawn that the usability of the website is low.

7. Chapter Seven

Summary, Conclusion and Recommendation

7.1. Introduction

The main purpose of this study was to assess, analyze and make suggestions to enhance the state-owned media website: shabait.com. In order for the evaluation to be complete a usability test and competitive analysis of the website based on criteria developed from the literature review was performed.

This chapter consists of three basic parts. Firstly, a summary of the chapters is presented. Then the major conclusions that were drawn on the basis of the investigation are given. Finally, relevant recommendations for improving the website are provided.

7.2. Summary

A website needs regular follow-ups and improvement after it is published, but for the improvements to be effective the website should be evaluated first. The assessment should focus mostly on testing the usability of the website, but should also test if the website is promoting the intended message properly. This is because every website development process faces its own unique challenges due to the different purposes of the website, type of organization, policy, objectives, available resource and limitations as well as characteristics of users. All these factors that have a direct impact on the website should be considered at the initial stage of website development plans. But, due to the dynamic nature of the digital world, as the life and success of a website can be too short, regular evaluation and upgrading are very important.

The first two of three techniques of evaluating websites (usability test, comparing with better quality websites of similar purpose and analyzing server log information) were used to assess shabait.com. Shabait.com is a one-year-old government owned media website in Eritrea. The website is an official medium of information for the government of Eritrea, aiming at giving reliable information about the country and its development to the Eritrean community residing outside the country as well as for anyone who is interested to find out about Eritrea.

75

The evaluation of the website shabait was based on both qualitative and quantitative methods and the result shows that the website does not have good usability and is not competitive in the dynamic web environment. Hence, currently the website is not very successful.

7.3.   Conclusion

In order to create a good quality website, it is essential to have clearly specified goals, policies and strategies, and enough human as well as technological resources. Moreover, overcoming the most common challenges such as competition, diversity of users, budget constraints and inadequacy or incompatibility of international and national legislation that is necessary for protecting intellectual property rights and privacy rights, is very important when joining the World Wide Web. Hence when planning to develop a website one must consider almost all the factors that can basically affect it in a way and plan the website in such a manner that it maximizes profit and minimizes risks. This will help organizations to be proactive and to be ready for any consequences that could occur, before revealing their information to everybody through the Internet.

Any website should pass through each of the nine important stages: design critique, website definition and planning, website specification, information architecture, website design, website construction, website testing, website marketing and maintenance during development. After it is been published, its URL should always be advertised in everything concerning the organization. In order to identify the success and failure of a website, an evaluation must be performed from time to time. The evaluation should be based on the following criteria: quality of content, attractiveness, user control, efficiency, helpfulness, learnability and accessibility. As technological advancement is so fast, creating a website should never be considered a once only process, but websites should be checked continuously and modified by performing regular evaluations.

The assessment can be done by one or more of three different processes such as usability tests (analyzing data collected from users' feedback and from skilled evaluaters), comparing the evaluated website to similar websites that can be used as benchmarks, and by analysing the reports from server logs. Even though performing only one of the tests can assist to identify the weakness and strength of a website, the best and most recommended is to use the analysis of all the three types of evaluation techniques and integrate the results. Making all the needed

76

improvements based on the conclusions derived from the three types of evaluation helps a website to stay successful.

Shabait.com is a website, whose aim is to give news and information about Eritrea to all concerned people in the Diaspora. The unavailability of an information policy/ICT policy in the country, low bandwidth and having poorly skilled staff are the main difficulties of the website. Moreover, shabait.com faces the challenge of a powerful competitor inside the country, shaebia.com, and of many others outside. So far no improvement is noticed on the website in its one year of existence except for the slight changes in the background colour at an earlier stage. The usability test as well as the comparative analysis of the website indicated that the website is not presenting its information to the users in an appropriate way. The website is not very attractive, nor user friendly, of low content quality as well as low download speed. Besides it was not advertised well, so there definitely are potential users out there who have no idea that it exists. The following are some of the drawbacks of the website.

7.3.1. Unavailability of policy

There is no proper ICT policy drafted in the country and the policy of the organization itself is still under proposal and not yet approved. This might cause difficulties when identifying what degree of access to information and freedom of expression there can be and what information to publish and how to protect the intellectual property rights of the published works.

7.3.2. Limitation on resources

Technological as well as human resources are not adequate for a website as big as shabait.com that represents the government of a country and that aims to be a sole first hand information provider about the country.

7.3.3. Diversity of users

Although the website targets users all over the world, the idea of publishing the website in only one language might make it difficult for some users who prefer languages other than English. Information coming from a government organization should be accessible to every citizen of the country even to those who prefer other languages. Moreover all information is not accessible by people with physical disabilities.

7.3.4. Lack of beauty

The website is neither aesthetically appealing nor comfortable to read.

7.3.5. Improper information architecture

Pages that are expected to contain static information with regards to the culture, history and development of the country are empty. This implies that a proper information inventory and search for new information to complete the content of the pages was not done properly during the information architecture stage of website development process.

7.3.6. Poor quality of content and organization

Mostly due to the poor skill of manpower, contents presented on the website do not have good quality. In addition, contents are not organized in such a way that similar contents are grouped together, and navigation has no flow.

7.3.7. Poor marketing

The website is not advertised well, not even in the three medias of the country, the TV, radio and newspaper where no payment is required.

7.3.8. Inappropriate Domain name

The domain name of the website does not represent the website entirely and it is not easily remembered by many users.

As a result shabait.com is not fit to be considered as a sole first hand information provider website for the Eritrean society as well as for anybody who is concerned about Eritrea.

7.4. Recommendations

Here are some recommendations for the improvement of Shabait, Shaebia, the BBC as well as the Chinese website.

7.4.1 Recommendations for the improvement of shabait.com in the short term

Based on the findings of the evaluation the following recommendations can be made regarding the state-owned media website.

1. It would be much easier if an ICT policy were developed in the country.

78

2. Although the website is run by government and funded by a government subsidy, it would be more beneficial to the Ministry if the website is also used for advertising purposes by providing an ad banner. If managed properly an ad banner can be a good money generating area for the website and the Ministry in general.

3. It would lead to better recognition, if the domain name were changed into a simple and very expressive one. Possible domain names can be Eritrea.gov.er, Eritrea.org.er, Eritrea.co.er, EriNews.gov.er, EriNews.org.er, EriNews.co.er, Eritreanews.gov.er, Eritreanews.org.er, Eritreanews.co.er, Eriinfo.gov.er, Eriinfo.org.er, Eriinfo.co.er, Eritreaninfo.gov.er, Eritreaninfo.org.er, and Eritreaninfo.co.er.

4. Making the logo of the website as simple and expressive as that of the BBC and China would make it much more attractive.

5. The interface design could be attractive if it were simple but eye-catching. Hence the background needs to be changed to a lighter colour and the text into dark. Black text on a white background will be the perfect choice for readers, as it will be more convenient to the eye when reading information from the screen.

6. The website would be accessible to more users, if it were designed to accommodate the three basic languages in the media of Eritrea. Making the default home page of the website English, with the possibility of finding the Arabic and Tigrinya pages will make it more convenient.

7. Navigation will be much easier if the present illogical grouping of contents is rearranged. It would be better if contents were grouped into News (under which national news, local news and editorial news can be grouped), Radio, Newspaper, TV programmes, Weather report, Sport, Commentary, History, Culture, Arts and Archive. These 11 groupings can be used in all the three languages but if there is no content related to one group in a specific language the group should be deleted from that specific language's home page. TV programmes and the weather report can be included in the website. At present as Eri-TV is reaching the Diaspora through Arab Sat, including TV programs on the website will be helpful to those who will want to follow specific programmes, and weather forecasting is part of the information that a media website is expected to provide.

8. Some of the contents such as History and Culture should be well researched and written and put in the website as a permanent web pages so that interested users can get information about the history and culture of Eritrea. These pages do not need

frequent updating, whereas the other pages such as Sport and Arts should contain all recent news and activities by Eritreans inside or out of the country.

9. Contents of the website needs to be written by skilled writers, hence training in writing skills in all the three languages is essential for the Shabait staff.

10. An archives page which is directly linked to a database of earlier contents is very necessary. This gives users an easy way to refer back to news or information which was posted earlier.

11. Providing a website map or table of contents will be also very helpful for users.

12. Providing alternative texts for graphics and text option for audio files will make the website more accessible.

13. To attract more users the URL of the website must always be mentioned in every service of the ministry

7.4.2. Recommendations for the improvement of shabait.com in the long term

1. As the nature of the website is dynamic, having a server based in Eritrea will give the webmaster full access and it will make uploading of contents much easier.

2. The website should consider locals as target users in the long run and should include information important for locals as well.

3. Regular evaluation and enhancement will ensure the website's long term success.

7.4.3. Recommendation for the improvement of both shabait.com and shaebia.com

Both websites, shabait.com and shaebia.com, can be more successful if they share human and technological resources as well as information while at the same time differentiate their service. Their information services can be different if shabait.com focuses more on news and news related subjects while shaebia.com focuses on other political and cultural related information.

7.4.4. Recommendations for the improvement of the BBC and Chinese websites

1. Information will be more accessible if it is archived based on publishing date.

2. Screen windows can be more effectively used if the width of the window is adjusted to be flexible.

3. Information in the Chinese website will be more accessible if it includes alternative texts to graphics.

References

Abdurrahman, N. 2004. Personal Interview. January, Asmara.

Alexander, B. Web Website Development Process - The life-cycle steps. [online] Available: http://www.macronimous.com/resources/web_development_life_cycle.asp [24/05/2004]

Alexander, J. & Tate, M. 1999. Evaluating web resources: Checklist for a news webpage. [online] Available: http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/news.htm

Alsup, M. 2000. Enterprise-wide document management: fact or fiction? *Document world*. Jan/Feb 2000:26-28.

Andemariam, K. 1999. *Information technology policy and management in developing countries: the case of Eritrea*. Groningen: University of Groningen.

AskOxford.com. 2004. [online]. Available: http://www.askoxford.com/dictionaries/compact_oed/?view=uk

Berkun, S. 2003. How to run a design critique [online]. Available: http://www.uiweb.com/issues/issue23.htm

Boucher, J & Smith, M. 2000. *Website redesign follies. In Proceedings of the 28th annual conference on User services: Building the future*. New York: ACM Press.

Brinck, T., Gergle, D. & Wood, S.,c2000. *Usability for the web*. San Francisco: Morgan Kaufmann.

Buning, M.E. 2000. How to Evaluate the Information on a WWW website? [online]. Available: www.wheelchairnet.org/WCN_TownHall/Docs/websites.html

Buys, R. (ed.) 2000. *Cyberlaw @ SA – The law of the Internet in SA*. Pretoria: Van Schaik.

Chisholm, W. Vanderheiden, G. Jacobs, I.(ed.) 1999. W3C- Web content accessibility guideline 1.0. [online] Available: http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/

Competitive advantage. 2004. Strategic Management [online]. Available: http://www.quickmba.com/strategy/competitive-advantage/[13/07/04]

Content Management lifecycle and effective online relationship. 2002. White paper. (May 23, 2002 vol. 1)

Cook, M. & Cook, C. 2000. *Competitive Intelligence: Create an intelligent organization and compete to win*. London: Kogan Page limited.

De Klerk, W. 2001. *Website usability* .Thesis (MA)-University of Stellenbosch.

Dictionary.com. 2004. [online] Available: http://dictionary.reference.com/

Eritrea. Ministry of Information. 1996. *Press Proclamation No. 90/1996*. Asmara: Government Printer.

Eritrea. Ministry of Information. 2003. *Proposal for news guidelines*. Asmara: Government printer.

Eritrea. Ministry of Transport and Communication. 1994. *Proclamation to Provide for the Establishment of an Eritrean Information System Agency: Proclamation No. 53/1994*. Asmara: Government printer.

Eritrea. Ministry of Transport and Communication. 1998. *The Communication Proclamation. Proclamation No. 102/1998*. Asmara: Government printer.

Eritrea. Ministry of Transport and Communication. 2000. *Directive Number 43/1/2000*. Asmara: Government printer.

Fessahazion, M. 2004. Personal Interview. January, Asmara.

Greer, J. 2004. Advertising on traditional media websites: Can the traditional business model be translated to the Web? *The social science journal* 41(1). [Available on Science Direct]

Guenther, K. 2001. What is a web content management solution? [online] Jul / Aug 2001:81-84.

Guenther, K. 2002.Top ten rules for pushing Web standards in Online magazine. Information today Inc. [online] Available http://www.infotoday.com/online/default.htm

Gupta, M. & Jana, D. 2003. E-government evaluation: a framework and evaluation, Government information quarterly. 20(4) Available on science direct

Habtemariam, T. 2002. Personal Interview. June, Asmara.

Habtemariam, T. 2004. Personal Interview. January, Asmara.

Jaeger, P. & Thompson, K. 2003. E-government around the world: lesson, challenges and future directions, Government information quarterly 20(4). Available on Science Direct

Johnson, J. 2003. *Web bloopers: 60 common design mistakes and how to avoid them*. San Francisco: Morgan Kaufmann.

Johnson, S. Quotes on disappointment [online]. Available on http://www.samueljohnson.com/disappoi.html [24/04/2004]

Kantner, L. & Rosenbaum, S. 1997. Usability studies of WWW websites: Heuristic evaluation vs. Laboratory testing [online] Available http://www.teced.com/PDFs/sigdoc97.pdf [27/04/04]

Kapoun, J. 1998. Teaching undergrads WEB evaluation: A guide for library instruction [Online]. Available: http://www.library.cornell.edu/olinuris/ref/webcrit.html [15/04/04]

Kreizman, G. 2003. Creating an accessible government website. Gartner, Inc.

Laudon, K. & Laudon, J. 2002. *Management information systems – managing the digital firm.* 7th Edition. New Jersey: Prentice Hall.

Lynch , J & Horton, S. 2002. Web style guide [online]. Available: http://www.webstyleguide.com/index.html?/contents.html

Malhotra, Y. 1996. Competitive intelligence programs: an overview [WWW] [online]. Available: http://www.brint.com/papers.ciover.htm

Merriam Webster's online dictionary. 2003. [online]. Availale : http://www.csd.uwo.ca.

Montvillof, V. 2003. Information for all: culture and information society technologies. The sixth annual international converence EVA 2003 Moscow [online]. Available: http://www.evarussia.ru/upload/doklad/dokladEn_1141.doc [09/07/2002]

Montviloff, V. 1990. *National Information Policies*: *A handbook on the formulation, approval, implentation and operation of a national policy on information.* Paris:Unesco.

Nielsen, J. & Tahir, M. c2002. *Homepage usability: 50 websites deconstructed.* Indianapolis: New Riders.

Nielsen, J. 2000a. *Designing Web usability*. Indianapolis: New Riders.

Nielsen, J. 2000b. Why you only need to test with 5 users [online]. Available: http://www.useit.com/alertbox/20000319.html

Nielsen, J. 2002. Top ten guidelines for homepage usability [online]. Available: http://www.useit.com/alertbox/20020512.html

Nielsen, J. 2004. Risks of quantitative studies [online]. Available: http://www.useit.com/alertbox/20040301.html [15/05/2004]

Nunnally, J. C. c1978. *Psychometric theory*. New York: McGraw-Hill.

Porter, M. c1990. How competitive forces shape strategy. In *Competition and strategy*. Boston: Harvard Business School. 93p

Rappa, M. 2004. Intellectual property on the web. Managing the digital enterprise [online] Available: http://digitalenterprise.org/ip/ip.html [29/05/2004]

Relyea, H. 2002. E-gov: Introduction and overview. *Government information quarterly*. 19(1) 9-35. [Available on Science Direct]

Rosenfeld, L. & Morville, P. 2002. 2nd ed. *Information architecture for the World Wide Web*. Sebastopol: O'Reilly & Associates.

Rowley, J. & Farrow, J. c2000. *Organizing knowledge: An introduction to managing access to information*. Hampshire: Gower.

Shneiderman, B. 1987. *Designing the user interface: strategies for effective human-computer interaction*. Mass.: Addison-Wesley

Shneiderman, B. 2001. CUU: Bridging the Digital Divide with Universal Usability in Interactions 8(2) New York: ACM press. [online] Available: http://doi.acm.org

Smith, A. 2001. Applying evaluation criteria to New Zealand government websites, *International Journal of Information management*. 21(2) [available on science direct]

Stark, J. 2000. Engineering strategy development. [online] Available: http://www.johnstark.com/es1.html [25/03/2004]

Taylor, A. G. 1999. *The organization of information*. Englewood: Libraries.

Tesfamariam, H. 2004. Webmaster – Shaebia.com. People's Front for Democracy and Justice. January 2004.

Web usability questionnaire. [online] Available:http://www.wammi.com [25/04/04]

Whittaker , J. 2002. *Web production for writers and journalists*. 2nd ed. London: Routledge.

WordNet Dictionary. 2003. [online]. Available: http://www.hyperdictionary.com.

Appendix A: Usability Evaluation of shabait.com

I am working on the evaluation of shabait.com: an Eritrean government media website, with the objective of enhancing it, so that you as users will find it more attractive to rely on for trustworthy information about Eritrea. Since it is desirable to get input from many people in testing the usability of the website, you are kindly requested to fill in the following questionnaire. The questionnaire has 47 questions and should not take more than 20 minutes to complete.

Please visit the website (www.shabait.com) and rate its usability by responding to the questions listed below, according to the following instructions.
- Try to respond to all the items.
- Rate the feature/aspect on the scale of 1-6 from very bad to excellent or from fully disagree to fully agree or from very slow to acceptable, depending on the sections.
- Add comments about items at the end of each section.
- Give your answer by marking **X** in the space provided.
- Send the completed questionnaire to this e-mail: 14021315@sun.ac.za.
- Please complete and return the questionnaire before **20ᵗʰ of May 2004**.

Your location :-   USA   Europe   Asia

                 Africa ___   Australia ___

How often do u visit this website:-Only once ___   Sporadic   ___Frequently

Age :- ___

Gender :-   _M_   ___   F

Language preference :-   English   ___   Tigrinya   _Arabic

          Other

How did u find about this website: - Through a friend   Through search engine

      From links on other websites   From advertisement by the company   ___

Rate the following section from 1-6 with the scale of 1=Very Bad, 2=Bad, 3=Fair, 4=Good, 5=Very Good and 6=Excellent.

1. Attractiveness

Num	Questions	V. Bad					Excellent
		1	2	3	4	5	6
1.	How do you like the background colour?						
2.	How do you like the colour of the text?						
3.	Do the background and text colour make good contrast?						
4.	Are text written in suitable fonts?						
5.	Are text sizes big enough to be read?						
6.	Are fonts and sizes consistent throughout the website?						
7.	Are texts aligned attractively?						
8.	How is the image quality (logo and icons)?						
9.	Is logo expressive enough?						
10	How attractive is the colour of the logo?						
11	How distinct is colour of links?						

Comments

Rate the following section from 1-6 on the scale of 1=Very Slow to 6= Very fast

2. Efficiency

Num	Questions	V. Slow					Very Fast
		1	2	3	4	5	6
12	How quickly does the home page display/download?						
13	How quickly do other pages display/download?						
14	How quickly do pages with graphics display/download?						
15	How quickly do PDF files download?						
16	How quickly do audio/video files download?						

Comments

Rate the following section from 1-6 on the scale of 1=Fully Disagree to 6=Fully Agree

A-2

3. Helpfulness (choose five pages randomly)

Num	Questions	Fully disagree 1	2	3	4	5	Fully agree 6
17	Navigation is consistent throughout the website.						
18	There are links to the home page from every page.						
19	Title of current page is indicated in every page.						
20	Pages are not linked to themselves (Circular link is avoided).						
21	There are no missing links.						
22	Links are represented in labels and icons.						
23	Search box is found in every page						

Comments

Rate the following section from 1-6 on the scale of 1=Fully Disagree to 6=Fully Agree

4. Quality of Content

Num	Questions	Fully disagree 1	2	3	4	5	Fully agree 6
24	Authors of contents are always declared.						
25	Contents are well organized.						
26	Contents are always accurate.						
27	Contents are not biased.						
28	Contents are free from advertisement/propaganda.						
29	Contents/topics have good coverage.						
30	Contents on the home page are always current.						
31	Contents are always good grammatically.						
32	There are no spelling errors in all contents.						
33	Language style is always consistent.						
34	Headlines are always expressive and catchy.						
35	Writing style is convenient for reading online.						
36	Contents/articles are presented shortly.						
37	Contents/articles are presented in an interesting way.						

Comments

Rate the following section from 1-6 on the scale of 1=Fully Disagree to 6=Fully Agree

5. User control

Num	Questions	Fully disagree 1	2	3	4	5	Fully agree 6
38	It is easy to read the newspapers in PDF format.						
39	Notices and Advertisements are clear and readable in the PDF formatted newspapers.						
40	Audio can easily be listened.						
41	Earlier contents are easily accessible.						

Comments

Rate the following section from 1-6 on the scale of 1=Fully Disagree to 6=Fully Agree

6. Searchability

Num	Questions	Fully disagree 1	2	3	4	5	Fully agree 6
42	Search facility makes provision for both simple and advanced searches.						
43	Search facility makes provision for both beginners and expert users.						
44	Search items and number of hits are shown on the result page.						
45	Website can be easily found by searching using search engines such as google, yahoo,…etc.						
46	Navigation has logical flow.						

Comments

7. Accessibility (Please mark your answers with X for Yes/No)

Num	Questions	Yes	No
47.	Is the website accessible on your browser?		
48.	Is the website accessible on your platform?		

8. Browser and Platform (Please mark your answer with X in the space provided)

Which browser do you use: - Internet explorer   ___   Netscape Navigator   ___

                  Other (specify): _____

Which platform do you use:- Windows 98/2000/NT/XP   ___

                      Linux   ___

                      Macintosh   ___

                      Other (specify): _____

General comments:

Appendix B: Quantitative result of individual questions

Variables	Valid num	Mean	Median	Minimum	Maximum	Std. Dev
Question 1	13	4.31	4.00	2.00	6.00	1.18
Question 2	14	3.93	4.00	2.00	6.00	1.27
Question 3	13	4.15	4.00	1.00	6.00	1.34
Question 4	14	4.36	5.00	1.00	6.00	1.22
Question 5	14	4.14	5.00	1.00	6.00	1.46
Question 6	14	4.29	4.50	1.00	6.00	1.20
Question 7	14	4.00	4.00	1.00	6.00	1.24
Question 8	13	4.08	4.00	1.00	6.00	1.19
Question 9	12	4.00	4.00	1.00	6.00	1.35
Question 10	13	3.92	4.00	1.00	6.00	1.85
Question 11	13	3.69	4.00	1.00	6.00	1.70
Question 12	14	4.14	5.00	1.00	6.00	1.70
Question 13	13	3.85	4.00	2.00	5.00	1.28
Question 14	14	2.93	3.00	1.00	5.00	1.49
Question 15	13	2.23	2.00	1.00	4.00	1.09
Question 16	12	2.08	2.00	1.00	4.00	1.08
Question 17	12	3.92	4.00	1.00	5.00	1.44
Question 18	14	4.50	5.00	1.00	6.00	1.56
Question 19	13	4.84	5.00	2.00	6.00	1.28
Question 20	10	4.50	5.00	1.00	6.00	1.90
Question 21	13	3.46	3.00	1.00	6.00	1.56
Question 22	13	4.08	4.00	1.00	6.00	1.55
Question 23	13	4.69	5.00	1.00	6.00	1.49
Question 24	13	3.38	3.00	1.00	6.00	1.76
Question 25	12	3.75	4.00	2.00	6.00	1.29
Question 26	13	2.46	2.00	1.00	5.00	1.45
Question 27	12	2.33	2.50	1.00	4.00	1.151
Question 28	14	2.29	2.00	1.00	5.00	1.27
Question 29	14	3.21	3.50	1.00	5.00	1.31
Question 30	14	4.36	4.50	2.00	6.00	1.15

Quantitative result of individual questions

Question 31	13	3.23	3.00	1.00	6.00	1.64
Question 32	12	3.41	3.50	1.00	6.00	1.88
Question 33	12	3.17	3.50	1.00	6.00	1.64
Question 34	14	3.57	4.00	1.00	6.00	1.65
Question 35	13	3.76	4.00	2.00	6.00	1.36
Question 36	13	4.08	4.00	2.00	6.00	1.32
Question 37	14	3.43	3.00	2.00	5.00	1.09
Question 38	13	2.84	3.00	1.00	5.00	1.46
Question 39	12	2.83	2.50	1.00	5.00	1.40
Question 40	11	3.09	3.00	1.00	6.00	1.46
Question 41	13	2.92	2.00	1.00	6.00	1.61
Question 42	13	3.77	3.00	1.00	6.00	1.36
Question 43	12	3.75	3.50	2.00	6.00	1.29
Question 44	12	4.08	4.00	1.00	6.00	1.44
Question 45	11	4.91	5.00	2.00	6.00	1.38
Question 46	11	3.64	4.00	2.00	6.00	1.43

Whittaker A, Botha FC. 1997. Carbon partitioning during sucrose accumulation in sugarcane internodal tissue. Plant Physiol 115: 1651-1659.

Wingender E, Chen X, Hehl R, Karas H, Liebich I, Matys V, Meinhardt T, Pruss M, Reuter I, Schacherer F. 2000. TRANSFAC: an integrated system for gene expression regulation. Nucleic Acids Res 28: 316-319.

Wyrick JJ, Young RA. 2002. Deciphering gene expression regulatory networks. Curr Opin Genet Dev 12: 130-136.

Yanagisawa S, Schmidt RJ. 1999. Diversity and similarity among recognition sequences of Dof transcription factors. Plant J 17: 209-214.

Yanagisawa S. 2002. The Dof family of plant transcription factors. Trends Plant Sci 7: 555-560.

Yoshida K, Shinmyo A. 2000. Transgene expression systems in plant, a natural bioreactor. J Biosci Bioeng 90(4): 353-362.

Yu J, Hu S, Wang J, Wong GK, Li S, Liu B, Deng Y, Dai L, Zhou Y, Zhang X, Cao M, Liu J, Sun J, Tang J, Chen Y, Huang X, Lin W, Ye C, Tong W, Cong L, Geng J, Han Y, Li L, Li W, Hu G, Huang X, Li W, Li J, Liu Z, Li L, Liu J, Qi Q, Liu J, Li L, Li T, Wang X, Lu H, Wu T, Zhu M, Ni P, Han H, Dong W, Ren X, Feng X, Cui P, Li X, Wang H, Xu X, Zhai W, Xu Z, Zhang J, He S, Zhang J, Xu J, Zhang K, Zheng X, Dong J, Zeng W, Tao L, Ye J, Tan J, Ren X, Chen X, He J, Liu D, Tian W, Tian C, Xia H, Bao Q, Li G, Gao H, Cao T, Wang J, Zhao W, Li P, Chen W, Wang X, Zhang Y, Hu J, Wang J, Liu S, Yang J, Zhang G, Xiong Y, Li Z, Mao L, Zhou C, Zhu Z, Chen R, Hao B, Zheng W,

Chen S, Guo W, Li G, Liu S, Tao M, Wang J, Zhu L, Yuan L, Yang H. 2002. A draft sequence of the rice genome (*Oryza sativa* L. ssp. *indica*). Science 296: 79-92.

Zeng Y, Wu Y, Avigne WT, Koch KE. 1998. Differential regulation of sugar-sensitive sucrose synthases by hypoxia and anoxia indicate complementary transcriptional and posttranscriptional responses. Plant Physiol 116: 1573-1583.

Zhang H, Zhang R, Liang P. 1996. Differential screening of gene expression difference enriched by differential display. Nucleic Acids Res 24: 2454-2455.

Zhou DX. 1999. Regulatory mechanism of plant gene transcription by GT-elements and GT-factors. Trends Plant Sci 4: 210-214.

Zhu Z, Pilpel Y, Church GM. 2002. Computational identification of transcription factor binding sites via a transcription-factor-centric clustering (TFCC) algorithm. J Mol Biol 318: 71-81.